

# PC MAGAZINE

OVER 81 PRODUCTS REVIEWED

## High-Tech Hollywood

*How the PC  
Saved the  
Movies*

### GOOD AND CHEAP

- Media Laptops
- HDTVs
- Office Suites

### BEST BATTERIES

*They Really Come  
From...IKEA?*

*Hammy, One of the  
Digital Stars from  
Over the Hedge*

### SPECIAL FEATURES

- *Inside the Astounding  
New Lucas Film Complex*
- *Linux, AMD, and the PCs  
Running DreamWorks*
- *The Laptop Behind  
The War of the Worlds*

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- Print speed: up to 31 ppm black and color
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- Parallel, USB 2.0 and Ethernet ports

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### HP LaserJet 4345x mfp Multifunction Printer

- Monochrome printer, copier, fax and color scan to e-mail
- Print and copy speed: up to 45 ppm
- Print resolution: 1200 x 1200 dpi with HP FastRes 1200
- Duty cycle: 200,000 pages per month
- Parallel and Ethernet ports



\*Call your CDW account manager about available \$200 mail-in manufacturer rebate; offer valid 5/1/06 to 7/31/06. \*HP color access control helps you manage color printing usage. With it, you can enable or disable color printing by individual users or groups, or you can disable it entirely. \*Call your CDW account manager about available \$300 mail-in manufacturer rebate; offer valid 5/1/06 to 7/31/06. Offer subject to change without notice.



#### Lexmark C522n Color Laser Printer

- Network-ready, color laser printer
- Print speed: up to 20 ppm black and color
- Resolution: 1200 x 1200 dpi, 4800 Color Quality
- Duty cycle: 45,000 pages per month
- USB and Ethernet ports

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CDW 533372

**LEXMARK**

#### Lexmark X644e MFP Multifunction Printer

- Monochrome laser printer, copier, fax, scanner and scan to e-mail
- Print speed: up to 50 ppm
- Resolution: 1200 x 1200 dpi
- Duty cycle: 225,000 pages per month
- USB and Ethernet ports



#### Brother MFC-8460N Multifunction Printer

- Network-ready, monochrome laser printer, copier, fax, PC fax and scanner
- Print and copy speed: up to 30 ppm
- Print resolution: 1200 x 1200 dpi
- Parallel, USB 2.0 and Ethernet ports

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CDW 519060

**brother.**

**\$799<sup>99</sup>**

CDW 547682

**brother.**

#### Brother MFC-9420CN Color Multifunction Printer

- Network-ready, color laser printer, copier, fax and scanner
- Print and copy speed: up to 31 ppm black, 8 ppm color
- Print resolution: 2400 x 600 dpi
- Scan resolution: 9600 x 9600 dpi interpolated
- Duty cycle: 30,000 pages per month
- Parallel, USB 2.0 and Ethernet ports



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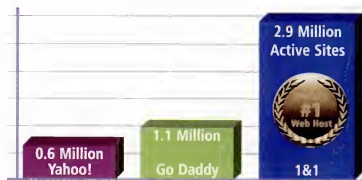
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Source: Netcraft Ltd - [www.netcraft.com](http://www.netcraft.com) March 1, 2006



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Photo Gallery	✓	✓	✓
Dynamic Web Content	✓	✓	✓
Web Statistics	✓	✓	✓
Chat Channels	✓	✓	✓
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Search Engine Tools	✓	Extra charge applies	\$29.95/year additional
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Portfolio-Level Back-testing	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>?</b>
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<sup>5</sup> System availability and response time may be subject to market conditions.

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## » PCMAG ONLINE

See PCMag.com to find the best hardware to fill your entertainment needs, from HDTVs and Media Center PCs to MP3 players and portable speakers. Our online product guides let you compare your favorite tech toys side by side. Check them out at [go.pcmag.com/reviews](http://go.pcmag.com/reviews).

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## FIRST WORD

BY JIM LOUDERBACK, EDITOR

**Along with handwritten callouts to explain noteworthy features, we've added Web addresses leading to in-depth reviews online.**



**N**OW THAT YOU'VE HAD A FEW issues to digest our new look, I'd like to introduce you to some of the key new elements and help you discover what's behind the design.

Let's start with our expanded and revamped reviews section, called, as always, First Looks. This section is divided into three areas: Hardware (PCs, notebooks, printers, scanners, and hard drives), Consumer Electronics (phones, cameras, HDTVs, and home theater systems); and Software, Networking, and Services (Internet sites, shrink-wrapped software, and security products).

In addition to featuring pages of product reviews, each section includes a two-page Buying Guide that provides advice, review summaries, our picks for best and worst products, and expert analysis of key product categories. In this issue, we examine Microsoft Office alternatives, Media Center laptops, and plasma TVs. Next time, we'll focus on low-cost MP3 players, gaming PCs, and online backup services.

Although many of the products we review are suitable for both home and office, we've added a fourth section dedicated to small-business and work-specific products. Finally, there's a new area that focuses on digital products designed for cars—and the high-tech cars themselves.

Along with handwritten callouts to explain particularly noteworthy features, we've added a "go"

redirect for each product—a Web address in the form of [go.pcmag.com/\[product name\]](http://go.pcmag.com/[product name]) that leads to an expanded "at a glance" summary of the product. This includes specs, an overview of our test results, links to the best places to buy the product on the Web—and a link to the full review.

Every First Looks review in our magazine is backed by hours of testing by our team of expert lab analysts. There's way too much to put into print, but we've expanded each online review to capture all the detail. The full review may span pages, including detailed lab and benchmark test results, a photo slide show, and often a video of the product in action.

Each Buying Guide in the magazine has an online counterpart—we call them Product Guides—available via a prominently displayed link. There you'll find an easily sortable table of every product in its category that we've reviewed. You'll also find an expanded How to Buy discussion, along with details on our testing methods, our favorite products, best prices, and much, much more.

There's a lot more to discover inside the revitalized PC Magazine. Explore it yourself. Oh, and I've heard from a number of you wondering what happened to Backspace. Although John C. Dvorak now graces the back page, those humorous pictures and captions remain, as part of our Feedback section. And as a nod to the past, Backspace is once again called Abort, Retry, Fail. Call me nostalgic, but I miss that wonderfully concise error message. It lives on in our memories—and now in PC Magazine too. □

*This capsule review offers a clear, concise analysis of the product*

**MORE ON THE WEB**  
You can contact Jim Louderback at [Jim.Louderback@ziffdavis.com](mailto:Jim.Louderback@ziffdavis.com). For more of his columns, go to [go.pcmag.com/louderback](http://go.pcmag.com/louderback).



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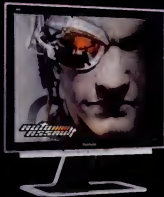
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Windows  
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## PERSONAL TECH MAGAZINE

**TV? Cars? I do get that technology is everywhere now, and I welcome it. But I didn't exactly subscribe to PC Magazine to help me buy a car. There are many other places I can get cars rated, especially since this is a purchase I make every five to ten years. I buy other tech all the time, and that is what I want to find in PC Magazine. Perhaps with your change in emphasis, you should rename the magazine to PT for "Personal Tech." At least it would be more descriptive of the direction you say you're going in now.**—Victoria H. Hess

### SOMETHING RIGHT

I'm old and cranky and I hate change. But I like the new format. You must have done something right. Kudos for everyone.  
—George W. Crawford

### HELP US READ THIS

Editor Jim Louderback boasts of PC Magazine's elegant new look in the April 25 issue, but you seem to have missed the most important purpose of a magazine, which is to be read—and which your new look defeats. You have chosen to print with smaller, finer type, which makes it harder to read. The red sidebars in even smaller type make me wonder who you think your readers are. We don't all have the vision of eagles. You should realize that we frequently try to read your publication in less than the best of lighting, after having spent hours in front of a computer screen with bleary eyes. I don't need more headaches brought on by your microscopic print.—Kenneth E. Richter

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We welcome your comments and suggestions. When sending e-mail to Feedback, please state in the subject line of your message which article or column prompted your response. E-mail [pcmag@ziffdavis.com](mailto:pcmag@ziffdavis.com). All letters become the property of PC Magazine and are subject to editing. We regret that we cannot answer letters individually.

We received a lot of feedback about our new fonts. They are, in fact, bigger, but some still find them less readable. Sorry! We're increasing the font size, and revisiting some of our color choices to improve readability. We'll continue to cover PC-style computing in all its forms, but don't worry: Getting the most out of Windows- and Intel-compatible systems remains at the core of what we do.—Jim Louderback

### A TELEGRAM TO TREASURE

As John Dvorak mentioned (Inside Track, March 21, page 63), a lot of people would have jumped at the opportunity to send that one last Western Union telegram, and Western Union could have turned a tiny dollar had they marketed John's idea. At least one day when I'm old, I'll be able to show that I once used this bygone form of communication. In 1982, my husband was in a business meeting across the country. I sent him a telegram that read simply, "The rabbit died." STOP. Message received. Just as rabbits are no longer used to determine pregnancy (nor were they in 1982), telegrams are a thing of the past. But my son will be able to show his grandchildren the form of communication their great-grandmother used to announce his pending arrival.

Thanks to John for his always enjoyable column.—Elizabeth J. Blackey

### WHY WE DON'T GO TO MOVIES MUCH

Thanks to Lance Ulanoff for "Film Technology Threat" ([go.pcmag.com/filmthreat](http://go.pcmag.com/filmthreat)). My wife and I were longtime frequent moviegoers until the past year. Setting aside the decline in movie quality for another time, let's examine why our attendance has dropped to maybe once or twice a month. After paying \$17 for two senior tickets, we find many perks included in this expensive price that weren't mentioned in the advertising:

The theater is filled with continually flashing cell-phone lights, giving us the impression that we're attending what appears to be a national firefly convention. Cell-phone conversations are in progress all around us, some well into the feature. A request to take the phone outside is met with instant hostility and rudeness. Management then expects me to miss several minutes of the film while I leave the theater in search of some form of backup. This usually doesn't exist, and we're mostly on our own.

Popcorn lab tests are conducted throughout the theater to determine who can out-rattle the other offenders. I suspect someone gets a prize at the movie's end. There's constant chatter all around us, as though the audience is attending a Lakers basketball game. And a seat tester always places himself behind us in order to conduct seat construction endurance tests by rhythmically bashing the row of seats in which we're seated.

I once timed the interval from lights down to the actual feature opening and was rewarded with 25 minutes of clutter and thundering soundtracks.

It might be asking too much, but I'd love to take an AMC executive to a movie as my guest, just to watch his face.—Bill Wyse

*Can we go too? That could be more fun than the movie itself!—JL*

### IT'S THE PRICE, SONY

Sony can do all the studies it wants, but as long as an e-book is priced at \$300 to \$400, I think that explains "why users

haven't adopted e-books." (See *go.pcmag.com/e-books2*.) The need to put up an initial investment of that magnitude and then have to pay \$15 to \$20 per book (as in audio books) will keep the Sony Reader in limited use. I also think that the Philips Readium will have a better chance, due to its size and portability, if Philips can keep the initial price down.—*LeW LaCoss*

*If Sony follows its Memory Stick and UMD roots, you're right. However, if you can publish your own text to the reader, Sony might have an edge. I hated the last generation of e-books—until they let me load my own content. Now my biggest fear is that my REB 1200 will die before the Sony Reader comes out.—JL*

## THE FIRST HYBRID

You actually have to go all the way back to 1914 to find the first one, the Galt Gas Electric! See *www.econogics.com/ev/hvhistg.htm*.—*Peter Burnside*

## LIFE IMITATES FICTION

In "Designs to Go" (Pipeline, April 25, page 16), you mention a pen-shaped cell phone. Remember *The Man From U.N.C.L.E.*? Napoleon Solo was always talking into his pen, and it was voice activated as well. Another case of fiction-inspired technology. Open Channel D. —*Alan Zimmerman*

## WHEN DRM TRASHES CONSUMERS' RIGHTS

Jeff Miller's response to Bill Machrone's column regarding the passage of the Digital Millennium Copyright Act (Feedback, February 21, page 69) was passionate but ill founded. While perhaps not within the letter of the law, it seems reasonable for a consumer to consider his purchase as the right to view the content, more than the right to view the DVD itself. The reason I carry a laptop is to consolidate my books, games, and other material and eliminate as much extraneous stuff (weight) as possible. However, if content providers want to make the flexibility or portability that *could* be enjoyed in the digital world so difficult that I wouldn't bother to buy the first copy, it's their business. My life wouldn't be adversely affected. In fact, I could argue that it would be better. But I doubt that building digital devices to force us to comply with copyright protections is a good answer.

The fact is, these devices not only prevent illegal copying, they also prevent legal copying. Years ago, I rented DAT [digital audio tape] equipment to record my daughter's senior recital. This was dig-

itally copied to a CD. I then tried to copy the CD to pass on to family and friends, with the intent of encouraging them to copy it for anyone else who might be interested. The digital protection scheme wouldn't allow me to do it! This was my own material, yet the tools that I had wouldn't allow multiple-generation copies because they presumed that I started with copyrighted material simply because it was digital. (I checked multiple sources: No method to fix this was available with consumer-level devices.)

Make all the laws you like to make it illegal to copy copyrighted material, but don't go so far as to make it impossible for consumers to use consumer-level tools to do their own work. With the increasing use of CD and DVD to record and produce original material, protecting the rights of the consumer is far more important than protecting Sony's bottom line. So, put me in jail if I violate your rights, but don't take away my rights in the process.—*Jack Britton*

## WE CAN'T EXPECT PRIVACY IN PUBLIC

I read Lance Ulanoff's latest online column, "Camera-Phone Danger" (*go.pcmag.com/cameraphonedanger*) this morning, and it brings up an interesting issue: How much privacy should a person expect in public?

What's so awful about taking somebody's picture? It's not as if it captures the soul. Unless one is hidden within the

privacy of one's own abode, there should be no expectation that one is somehow protected from being photographed. Surveillance cameras are at work all the time and keep everyone safer as a result. If people have a problem with having their picture taken, then either they need to get over their phobia or they should stop doing whatever it is that's (potentially) embarrassing them—otherwise they should hang out only at spots that have a "No Photography or Video" sign posted. —*Daniel A. Dias*

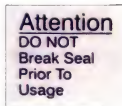
*Thanks for the note, Dan. You make quite a few interesting and relevant points, but you should also keep in mind that it's for the exceptions that companies often get sued and not for those following the rules.—Lance Ulanoff*

## NOTHING TO FEAR?

Since Eric Schneider (Feedback, April 25, page 14) is so comfortable giving up his own freedom for what he perceives to be greater security, then surely he wouldn't mind sharing with readers of *PC Magazine*, or with Internet users, his Social Security number, home address, phone number, mother's maiden name, date of birth, annual income, and so on. Better yet, how about I go to his house and have a look around—in the interests of improving security for everyone. After all, if he's innocent of doing anything that would threaten anyone's security, he has nothing to fear. Right?—*Shawn McLaughlin*

## ABORT, RETRY, FAIL

BY DON WILLMOTT



*Looks like we've arrived at an impasse.*

*Who knows? Maybe cat owners won't insure their \$1 mousepads.*



*When ads and headlines collide.*



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# PIPELINE

WHAT'S NEW FROM THE WORLD OF TECH



## HEAD CONK

Millions of people around the globe seek medical treatment for head trauma each year. And other than flashing light in a patient's eyes to see if the pupils dilate and contract, emergency medical technicians and paramedics often have no way to tell whether a patient has an injured brain.

Enter the Infrascanner. It's a handheld device from InPhase designed to detect instantly whether a hematoma (bleeding in the brain) is present.

How does it know? Based on patented work from university researchers, the Infrascanner detects brain injury by looking for the difference in infrared light absorption between a bleeding and a nonbleeding part of the brain. It uses the light-absorbing property of the hemoglobin in the blood. In a test involving more than 300 patients, the device identified the severity of bleeding in hematoma cases and returned no false-positive results. The Infrascanner's next step will be to head for FDA approval. Who'da thunk it?—SR



## Data in 3D

*Holographic storage is coming out of the labs. Will it soon go mainstream?*

**D**ESPITE THE REVOLUTIONARY increases in storage capacity in recent years, there's just never enough, is there? Perpendicular recording, which stacks data bits vertically instead of horizontally, has ushered in several huge hard drives. And now, one of the less-developed forms of next-generation removable storage technologies is growing up: holographic storage.

InPhase Technologies, based in Longmont, Colorado, has just demonstrated the highest data density for any commercial storage technology by recording 515 gigabits of data per square inch. Later this year, InPhase is looking to deliver a holographic drive based on its Tapestry design (shown), which will offer 300GB capacity on a removable,

DVD-size disc with a 20MB-per-second transfer rate. The first drive will be followed by a unit with capacities ranging from 800GB to 1.6TB, according to the company.

"We will ship such a holographic drive to manufacturers before the end of this year," says Liz Murphy, vice president of marketing for InPhase. "The cost for end users will probably be around \$15,000—so it's not cheap, but it's getting there."

Holographic storage devices record data throughout the entire multidimensional volume of a drive instead of putting data only on a single layer. Researchers have worked for years to find media stable enough for multidimensional holographic recording; soon consumers could store over 100 movies on an ordinary-looking portable disk.—Sebastian Rupley

## SHADES OF STAR WARS



South Korea intends to integrate robots into both national security efforts and many parts of people's lives, according to several reports. *The Korea Herald* has reported that robots armed with guns will be deployed along the border with North Korea, at a whopping rate of 250 robots per kilometer. That's a big gang of Terminators!—SR

## POKER PLEASE

A Web site's attractiveness may be measured by its number of unique visitors or by how much time each spends there—how "sticky" it is. By the second measure, PokerStars.com rules the roost.

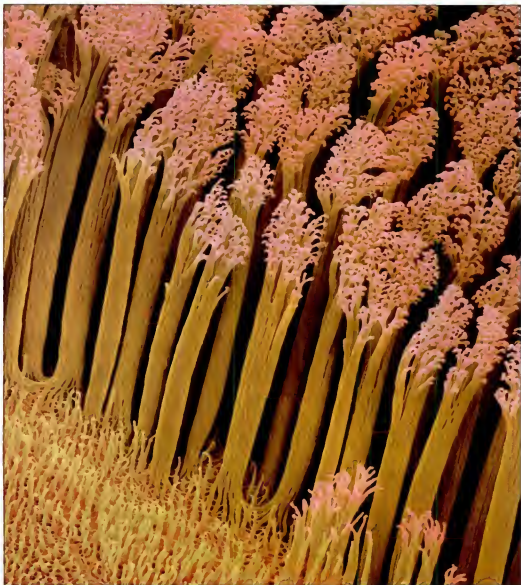
Time spent per month, per U.S. user, in hours:minutes

1. <b>PokerStars.com</b>	18:30
2. <b>AOL</b>	6:30
3. <b>FanFiction.Net</b>	4:50
4. <b>Juno Online Services</b>	4:34
5. <b>Electronic Arts</b>	4:11

Source: Nielsen/Nielson, March 2006

**MINI WEB** Can the whole Web be put on a hard drive for off-line searching? Not exactly, but start-up Webbaroo, [www.webbaroo.com](http://www.webbaroo.com), is trimming the fat and offering Web Packs—go-anywhere subsets of online information such as city guides, Wikipedia, and more.

## FUTURE WATCH



## Eat Your Heart Out, Spider-Man

**W**HY SHOULD WE CARE HOW GECKOS CLIMB WALLS? Because they can show us how to design wall-climbing robots, clearly. At U.C. Berkeley's Poly-PEDAL Laboratory, researchers are working on numerous ways to mimic the wall-climbing and walking advantages that many animals and reptiles have.

Geckos, for example, can climb walls and even stick to ceilings because their toes are covered with millions of fine, hairlike structures called setae, which have offshoots called spatulae at their ends (shown in the photo above). When the spatulae come in contact with a surface, the molecules in them form a tight bond with surface molecules, and the gecko sticks. Several labs are working on robots with synthetic spatulae.

At left, a miniature robot modeled after a gecko's climbing abilities is seen scaling a surface. Don't look down!—SR



## LOOK BOTH WAYS

Meet the Wayfarer. No, not the sunglasses, silly. The Wayfarer is a fully autonomous PackBot from iRobot, designed to perform urban reconnaissance missions, including perimeter, route, and street reconnaissance. On board you'll find GPS, stereo-vision technology, and more. The Wayfarer can travel beyond communications range to map urban environments and return with a video log of what lies ahead. Oh, and don't try to flip off the driver. There isn't one.—SR

# ROBOSAPIEN™ V2

## HUMANOID, INTERACTIVE, WAY COOL

Built on the foundation of Robosapien™—the bestselling robot of all time—Robosapien V2 is the next generation in consumer robotics.

Towering over your living room floor at a remarkable 24" in height, Robosapien V2 offers more advanced dynamic motion, powerful interactive sensors, natural speech capability, and, of course, a unique personality. The only humanoid entertainment robot who can strut his stuff, Robosapien V2 uses fluid biomechanical movements for walking, bending, sitting, standing, lying down, standing up, and dancing. You can't cut up the rug without some special moves. And Robosapien V2's got all of the best moves covered. Armed with articulated shoulders and wrists, movable hands, and a flexible waist, Robosapien V2 can dance his way around your home.

Humanoid activity isn't restricted to this robot's movements, Robosapien V2 also has an interactive humanoid personality!



### "GIMME, GIMME, GIMME"

Unlike other robots, Robosapien V2 can interact with his environment, autonomously. Whether filled with chairs, tables, pets, or people, this robot can see, hear, and walk his way around your house avoiding

obstacles in his path. This is free roam mode.

Using a unique dual-range infrared (IR) vision system and elaborate touch sensors, Robosapien V2 will act like one of the family during these free roam strolls.

Bristling with a battery of sophisticated sight, sound and touch sensors, Robosapien V2 is capable of unprecedented multi-sensory environmental interaction with both humans and objects.

Equipped with a sensitive suite of tilt sensors, Robosapien V2 actually knows up from down. So if he has fallen, he can indeed get up. He'll inform you about this prone position, utter, "I need to be upright for this" and, in a few seconds, be back on his own two feet.



### "LET ME SCAN THAT"

Make a sudden movement in Robosapien V2's line of vision and he will flinch and ask you to identify yourself. Once

identified, you will be tracked with a sophisticated IR vision system.

But there is more than IR vision that meets this robot's eye. Robosapien V2 can see colors, too. Red, green, and blue objects can be recognized and tracked with his color vision camera.

What does that mean to you? Hold something blue in front of Robosapien V2's head and it will be recognized and grabbed. Now using his dual-range IR vision, Robosapien V2 will look for other blue objects, walk over to them, and drop his blue object. Just think, all of your blue socks can be sorted into a pile on your bedroom floor.

### "GET YOUR OWN DRINK"

Remember that personality that you liked so much in Robosapien? Well, it's fully developed in Robosapien V2. Diabolical laughter, warning messages, and sharp-tongued robot wit are all dispensed in clear understandable natural speech. Packed with over 120 phrases, comments, reactions, and observations, Robosapien V2 is downright chatty.



### "GROUP HUG"

If you don't like the way Robosapien V2 is acting or interacting, control him directly or program your own sequence of movements and animations.

Packed with 100 pre-programmed functions and 6 programming modes, this robot also has 2 demonstration programs for an instant out-of-the-box "WOW".

A powerful multi-function controller is included with Robosapien V2. Use this controller to access all functions and features, as well as for creating program routines.

Oh, you don't like programming? That's OK. Robosapien V2 includes a revolutionary, interactive "puppet" programming feature that enables you to create a customized routine. Just move his body into different positions while Robosapien V2 automatically records and remembers each position.



### "WHAT WAS THAT?"

If you set him into Guard Mode, Robosapien V2 won't sleep on duty. Guarding your most valued possessions, he'll alarm intruders and give you a final head count of all intrusions.

If some of your family members are robots, too, like Roboraptor™ and Robopet™, Robosapien V2 is capable of interacting with these fellow Robo companions.

All of this interactivity can be tiring. This robot knows when enough is enough with a battery-saving auto-shut off function or by catching some quick "Zs" in sleep mode. You see, Robosapien V2 is more than a robot, he's a fusion of technology and personality.



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# CONNECTED TRAVELER

## SALT LAKE CITY

### TOP TECH ATTRACTIONS

#### Family History Library

35 North West Temple  
Track down lost ancestors at the world's largest repository of genealogical records. The 142,000-square-foot library houses 2.4 million rolls of microfilmed records from around the world ([www.familysearch.org](http://www.familysearch.org)).

#### Bonneville Salt Flats Speedway

Wendover  
Drive 120 miles west of Salt Lake City to see the speedway, the crazy cars, and the tent city erected every August during Speed Week.

### WHILE YOU'RE IN TOWN

The new Conference Center in downtown SLC is a marvel of both architecture and technology. Pop in on a Sunday morning to see the cavernous interior and hear the Mormon Tabernacle Choir perform their weekly broadcast of Music and the Spoken Word. Make the short drive to Park City to take in ritzy shopping and eating establishments, hit world-class ski slopes, and gawk at Hollywood starlets.



### FREE WI-FI HOT SPOTS

You'll be hard-pressed to find a hotel in Salt Lake City that doesn't offer free Wi-Fi in the lobby. Even if yours doesn't, a local company called XMission has blanketed quite a bit of the downtown area, including Main Street, with free coverage. You can also head over to the **Salt Lake City Public Library** (an easy walk from most downtown hotels) for free wired or wireless access in a pleasant, quiet atmosphere.

**FAST FACTS** Huge swaths of desert and isolated ski resorts make Utah a perfect place to use Nextel's off-the-network phone/walkie-talkie combos. Sprint and Verizon's EV-DO have pretty much the whole valley covered as well. **Transportation** Among the infrastructure upgrades done for the 2002 Olympic Winter Games, the handiest and most visible is the Trax light-rail system, great for getting around downtown SLC. **Connectivity** Nearby Provo, home to Novell and Brigham Young University, is putting the finishing touches on a municipal fiber-optic network that will provide every home and business with a supersonic pipe for cable TV, telephony, and Internet connectivity.

**AIRPORT FACTS** Fitting in at the Salt Lake City International Airport is easy—just bring your skis. We left our skis at home but brought our laptops, and we had all the tech amenities necessary to stay connected. Free Wi-Fi covering the entire airport lets you check flight, weather, hotel, and ground transportation info, or you can read the news. The airport also offers full Internet access for \$9.95 a day. For privacy, head over to Wayport's Laptop Lane, where you get your own booth and a T1 connection for 65 cents per minute. And if you're bored, InMotion Pictures rents DVD players and movies for use in the terminal and in flight.—*Kyle Monson*

### BEST WIRED HOTELS

#### Hotel Monaco

15 W. 200 South  
[www.monaco-saltlakecity.com](http://www.monaco-saltlakecity.com)

The Hotel Monaco's riotous décor and offbeat amenities have made it a favorite of regularly visiting execs who don't want to take their business trips too seriously. Besides having free Wi-Fi (a given in SLC hotels), each room has a goldfish to keep you company, a fax/copier/printer, and a CD stereo. Feeling cramped? Opt for a "tall room" with a 9-foot bed and an extra-high showerhead.

#### The Grand America Hotel

555 S. Main St.  
[www.grandamerica.com](http://www.grandamerica.com)

Salt Lake City's only five-star hotel, the Grand America employs a fiber-optic network for extra-speedy connectivity throughout the 80,000 square feet of opulent meeting space. There's a laptop-size safe in every guest room, and if you want something faster than Wi-Fi in your room, you can bring an RJ45 cable for free wired access.

#### Inn at Temple Square

71 W. South Temple  
[www.theinn.com](http://www.theinn.com)  
Besides boasting an ultraexclusive URL, the Inn at Temple Square has the market in old-time elegance cornered. The classic look blends perfectly with Temple Square next door. But don't let the exterior fool you; every room has data ports and free wireless access.





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## CADILLAC XLR

\$77,295

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**PROS** Active cruise control, head-up display, parking sonar, navigation system, steerable xenon headlights—all standard. Powerful, smooth Northstar V8 engine.

**CONS** Nav system washes out in sunlight. No Bluetooth available. Many Web site features unavailable to new owners.

**BOTTOM LINE** For those who value a smooth ride over rip-snorting performance, the XLR packs a load of technology features into a fixed price. Nifty folding-metal hard top. The small cockpit is best suited to smaller drivers.

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## CORVETTE FOR GROWNUPS

**C**ADILLAC LOADED THE XLR WITH technical goodies and made them all standard: a Denso navigation system, self-adjusting MagneRide shock absorbers (electromagnetically charged, oblong metal particles that change orientation to offer better resistance on stiff bumps), a head-up display, active cruise control, a power-retractable hardtop roof, rear-parking sonar, steerable xenon headlights, run-flat tires with pressure monitors, and keyless entry and ignition. And the XLR's edgy styling makes the XLR as distinctly Cadillac as tail fins were 50 years ago. Negatives include an LCD that's unreadable in sunlight, a cramped cockpit, weird door-release buttons, and little trunk space.

For owners, [mygmilink.com](http://mygmilink.com) has an electronic version of the owner's manual, and it also has a fatal flaw: Access to the advanced areas of the site requires you to enter your VIN (vehicle identification number), but it won't register the number for as long as 60 days after you buy the car.

The XLR is a polished boulevard tourer, more like the Jaguar XK or Lexus SC430 than the Mercedes-Benz SL coupe/roadster or BMW 6 Series. And the XLR has exclusivity on its side: Just 3,730 were sold in 2005. —BH



### NAVMAN'S GPS-CAMERA COMBO

As a first in the automotive GPS category, Navman is introducing the iCN750, a GPS system with turn-by-turn navigation and a digital camera. By combining the two technologies, the iCN750 can geocode pictures: Data on latitude and longitude is stored in EXIF. Navman is also launching a Web site where users can share their NavPix. The iCN750 has a list price of \$799.95 and is expected to be available in early May. —Craig Ellison



**BILL HOWARD**

## NAV FOR THE FLASHING 12s

**T**HE FIRST TIME I DROVE USING the new OnStar Turn-by-Turn navigation system, I was struck by the absence of a moving map display. I got over it—sort of. With this seventh-generation system, OnStar turns the power of technology loose on behalf of simplicity, but it doesn't have the longest features checklist.

Currently, no-frills OnStar is priced at about \$10 per month; it calls for help if there's an accident but offers no navigational assistance. The \$30-per-month plan includes directions read aloud by the always-connected operator. The way this works now, you press the Phone button on the rearview mirror and ask for directions, and the operator stays with you as long as the trip takes. This may be comforting, but it also costs OnStar a lot of money.

OnStar Turn-by-Turn works just like any other nav system—except there's no map. The operator downloads the route instructions to your car. As you approach a turn, a voice prompt tells you how close you are and which direction you should take.

Most cars will have a rudimentary text display indicating the distance to the turn and the street you're turning onto. But a prototype Cadillac STS system I tested didn't have an arrow indicating the turn direction. And if you go off course and opt to have OnStar navigate you back, you get cryptic messages—to drive south, for example, leaving it for you to figure out which direction is south.

Three cars are implementing Turn-by-Turn this spring: the Buick Lucerne and the Cadillac DTS now, and the sportier Cadillac STS a bit later. Virtually the entire 2007 GM line will have the new OnStar system—or more accurately, the buyer will have the option and can decide whether or not to pay for it. OnStar Turn-by-Turn navigation is included as part of the standard OnStar service for the first year on the Lucerne and Cadillac DTS and on the STS for the 2006 model year; extended pricing has not yet been announced. OnStar has said it expects that pricing would not be different from what others charge for downloadable nav help from, say, cell phones, which is around \$10 per month.

Despite issues such as the lack of a moving map and the inability to use Turn-by-Turn to set up trips for you on a built-in nav system, I'd say that Turn-by-Turn is a nice leap forward that OnStar accomplished by applying modest, low-key technology.

*Bill Howard is the editor of TechnoRide.com and contributing editor of PC Magazine.*



### THE EPA TAKES AIM AT SUVs

When the EPA announced tighter economy requirements for big SUVs and pickup trucks, to phase in from 2008 through 2011, it managed to annoy both environmentalists and automakers, who think the rules are either too lax or too stringent, respectively. The EPA will also recast its test procedures to emulate real-world conditions better; the last change was made in 1985. City mileage on the tests should fall by 10 to 20 percent, and highway mileage by 5 to 15 percent.—BH

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# FIRST LOOKS

WHAT THE RATINGS MEAN: ●●●● EXCELLENT | ●●●○ VERY GOOD | ●●○○ GOOD | ●○○○ FAIR | ○○○○ POOR

**H**oly-space-based radio transmissions! This satellite radio player (pictured) doubles as an MP3 player and is smaller than an iPod. Full review on page 28. Plus: Curious about all the "go" links scattered throughout First Looks? Type these links into your browser address bar thus, "go.pcmag.com/inno" (no "www" required), and you'll arrive at our full online review of the product.

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**Pioneer Inno**

The device itself is extremely cool; the service is top-notch and integrated beautifully with the XM + Napster client. But the Inno's price, which doesn't include XM service fees, may scare off those on a budget.

**\$399.99 list**  
[go.pcmag.com/inno](http://go.pcmag.com/inno)



1.7-inch color LCD supports graphics

Backlight-outlined buttons

Integrated antenna



**PIONEER INNO-VATES**

**P**IONEER'S NEW XM2GO PLAYER, THE Inno, is better in just about every way than its predecessor. Its brushed-aluminum front, glossy black trim, backlight-outlined buttons, and integrated antenna—as well as its slim dimensions of 3.6 by 2.3 by 0.6 inches—are definitely ultra-stylish. Plus, it weighs just 4.5 ounces, slightly less than a 30GB fifth-generation iPod. The Inno's big improvement over older XM2go products is its 1.7-inch color LCD, which supports graphics.

Using the player is also easier. The mode button switches between live XM radio and your own content. The DISP button toggles stock or sport info on and off at the bottom of the screen.

The player's integration with the XM + Napster client takes a cue from Apple. Imagine that: Hardware and software that work really well together!

The Inno is very easy to set up and use, and its audio quality is excellent. It even comes with in-ear headphones. I love that it can play live XM Radio, record up to 50 hours of XM content, and play my own MP3s and WMAs, but I wish that the capacity was larger than the current 1GB and offered more flexibility in partitioning the memory for XM and non-XM content. Right now you can use only half (512MB) of the capacity to store your MP3s.

It comes down to whether you'll pay the \$400 for the device plus the \$12.95 monthly fee for XM Satellite Radio. The XM service gives you quite a bit for the money, and the integration with Napster makes it an excellent way to discover and buy new music. The price is no higher than I'd expect for such a polished first-of-its-kind product, but I'd like to see the Inno's price go down and its memory capacity go up.—Mike Kobrin

3.6-inch screen

## RCA'S NEW PMP ALSO RECORDS

**W**ITH ITS STYLISH DESIGN, the RCA Lyra X3000 is a portable digital video recorder/player that has a lot to offer. This sleek 20GB Plays-ForSure-compatible device

does a lot more than just play audio and video: It can also record audio and video from any analog source.

You can view content on the built-in 3.6-inch 320-by-240 LCD or use the TV output. The device supports lots of common video formats, doesn't require a dock for recording, and lets you load content via drag-and-drop (Mac or PC) or Windows Media Player. It also comes with a top-notch bundle of accessories, including Sennheiser earbuds. Using the



### RCA Lyra X3000

This portable digital video player/recorder offers a user-friendly interface and flexible options, but its battery life and performance could use some improvement.

**\$399 list**  
[go.pcmag.com/lyrax3000](http://go.pcmag.com/lyrax3000)

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scroll wheel is an excellent way to navigate the well-structured menu system. The audio quality is very good, and the output is plenty strong. There's even a built-in speaker for those times when you want your buddies to listen in. In addition, the video recording quality at the highest setting is very watchable.

The downsides: subpar battery life, a storage capacity that's not quite large enough to justify the price, and a somewhat slow interface.—MK

### Cowon iAudio U3

The U3 is packed with more features than the Apple iPod nano, but its versatile design is reflected in its slightly higher price. 2GB, \$219.99 direct; 1GB, \$169.99 [go.pcmag.com/cowanu3](http://go.pcmag.com/cowanu3)

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1.2-inch screen



## COWON'S FLEXIBLE FLASH PLAYER

**T**HE COWON iAUDIO U3 IS A SMALL, lightweight MP3 player packed with a ton of features, including an FM tuner, voice/line-in/FM recording, and video playback. The 1.2-inch LCD is sharp and bright, but it's too small to view video or photos comfortably. When it comes to playing audio, though, the U3 sounds terrific. It has lots of sound-enhancement options, and it offers very broad file format support that includes the FLAC lossless compression format.

Unfortunately for WMA-based subscription and download fans, the U3 doesn't support Microsoft's PlaysForSure. Video files require some transcoding with the included software, but the player supports

frame rates only up to 15 fps, which isn't good for high-action sequences. Also, the U3 isn't as dead-simple to use as the iPod nano, and it doesn't have the tight software/hardware integration that makes Apple's players so successful.

The U3 may not be the greatest MP3 player ever, but I like it a lot because it's small and lightweight, and it has just about all the features I could want, including good battery life. I do wish the video played back at a higher frame rate, but as an audio player, the U3 is about as versatile as they come.—MK

## FIRST LOOKS

### CONSUMER ELECTRONICS



Glass viewfinder

Wireless printer adapter

#### Canon PowerShot SD430 Digital Elph Wireless

Although moving pictures by wireless is slower than moving them by USB cable, not having to hook up any cables is a joy.

\$499.99 list  
go.pcmag.com/sd430

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## LOOK MA, NO CABLES

**J**OINING A GROWING NUMBER OF WIRELESS point-and-shoot cameras is the pricey Canon PowerShot SD430 Digital Elph Wireless. This 5.0-megapixel ultracompact lets you connect wirelessly (using 802.11b) to a computer, network, or printer and offers a compelling mix of cutting-edge features, ease of use, and good image quality.

Portable and pocket-friendly, the camera has a tiny 2-inch LCD screen but also includes a small glass viewfinder that can be useful in bright daylight when the LCD looks washed out.

Connecting to both open and WEP-enabled infrastructure networks is a snap. The camera also supports ad hoc connections and lets you print wirelessly using the included printer adapter.

The SD430 has a 3X optical zoom and produces decent pictures. My test shots had good dynamic range and exposure. Resolution averaged 1,450 lines, which is near the top of the scale for a 5MP camera. Moreover, the SD430 has the quickest boot-up time of all the wireless cameras I've tested, at only 2 seconds.

If you hate having to find that USB cable every time you want to move pictures off your camera, the SD430 could be just what you need. —Terry Sullivan

## PLAY THAT FUNKY MUSIC

**T**HE SAMSUNG SCH-A950 BRINGS A jaunty look and a jog-dial navigator to Verizon's V Cast downloadable music service but doesn't set itself far apart from LG's competing VX8100. Reception and sound quality are both good, and the phone works well with a Bluetooth headset. I was even impressed with the 1.3-megapixel camera, which takes surprisingly sharp photos.

The phone's stereo speakers can kick out the jams at pretty high volume. Unfortunately, the phone doesn't support MP3 playback; it plays only WMA files off its microSD memory card.

Although the on-phone V Cast interface is almost painfully sluggish, V Cast Music (which downloads WMA-format songs to both your phone and your PC) is still the most elegant and complete music-phone solution available today. My tests found battery life on the high side for a Verizon phone. If you're looking for a V Cast Music phone to talk and rock out on, the A950 is for you. —Sascha Segan

#### Samsung SCH-A950

This tomato-red powerhouse is a terrific music phone for Verizon customers. \$399.99; from \$149.99 with service go.pcmag.com/a950

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Color screen doubles as camera's viewfinder



Stereo speakers

Music controls



## Find tools and guidance to defend your network at [microsoft.com/security/IT](http://microsoft.com/security/IT)

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One-touch buttons for major functions

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**\$1,199 list**  
[go.pcsmag.com/garmin2730](http://go.pcsmag.com/garmin2730)  
●●●●○

XM 30 satellite receiver

### PORTABLE SPEAKERS THAT GO BOOM!

IT LOOKS LIKE A THERMOS OR A PIPE bomb, but the BoomTube H<sub>2</sub>O is actually a rugged 48-watt portable speaker system. Originally released by Virgin Electronics, the product has been resurrected and slightly modified by its original manufacturer, Think Outside. The exterior hasn't changed—and the volume knob still goes to 11—but the power button now has to be held down for a few seconds before the unit turns on. According to my tests, the two active subwoofers and two powerful satellites provide full, detailed sound, and the 5-hour rechargeable battery is a plus. The carrying case is now slightly bigger, to accommodate the 13-inch long BoomTube better. The speaker also comes with a 3.5mm-to-2.5mm adapter to hook up a music-enabled cell phone. If you need a powerful, sturdy speaker when you're on the go, this definitely fills the bill.—Mike Kabrin

#### Think Outside BoomTube H<sub>2</sub>O

This portable speaker's audio quality is impressive, thanks to dual subwoofers, two powerful satellites, and integrated MaxxBass technology.  
**\$160 street**  
[go.pcsmag.com/boomtube](http://go.pcsmag.com/boomtube)  
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### GPS AND XM RADIO IN ONE

THE GARMIN STREETPILOT 2730 GPS NAVIGATION device takes the popular StreetPilot 2720 and integrates XM satellite services that make it an even better buy. The 2730 retains its predecessor's text-to-speech conversion, easy-to-use menu system, one-touch access buttons to its four major functions, and excellent 3.8-inch, 454-by-240 touch screen. It also offers multiple XM satellite services—Radio, Traffic, and Weather—thanks to the GXM 30 XM Satellite receiver. The GXM 30 can either sit on your dashboard or attach to your vehicle's roof.

XM NavTraffic, probably the most compelling feature, currently covers 22 metropolitan areas. The 2730 displays different icons for construction, congested traffic, accidents, road conditions, and disabled vehicles. During one of my road tests, when the system found an accident that blocked two of three lanes ahead of me it generated a new route, sending me to a service road that neatly bypassed the accident. As I sped past the stalled traffic, I felt empowered.—Craig Ellison

Users can check scores, view video clips, and customize coverage



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### THE PHONE'S GOT GAME

FOR SPORTS FANS, THE MOBILE ESPN MVP hits a home run from beyond the three-point line in a third and long situation. A big phone with terrific reception, volume, and sound quality, the ESPN MVP is packed with sports information delivered through a slick, easy-to-use interface. The system even customizes delivery of pages and videos of the players and teams you've shown an interest in. A supersharp screen, megapixel camera, and MP3 player round out the MVP's features, so I'll forgive its so-so battery life. Mobile ESPN's service, which uses the Sprint network, is expensive. Still, if you're willing to pay for your play-by-play, this is the phone for you.—Sascha Segan



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BUYING GUIDE

# Plasma TVs



Calibrate for  
impressive results

**P**IONEER ELECTRONICS OFFERED the first plasma display panel to consumers in 1997, and the public immediately embraced the idea of owning a thin-and-flat television that you could literally hang on a wall. Prices for plasma TVs have reached a historic low, and for larger screen sizes, plasma displays offer the best value among thin-and-flat televisions. They are an ideal choice for quality home-theater viewing, and selecting the right one is a matter of understanding your needs and staying within your budget.

Modern plasma displays are capable of producing very dark blacks, making them well suited for viewing in dimly lit environments. They also excel at handling video containing quick motion. For sports and action-movie fans, there is no better flat-panel display technology available today.

Making critical image comparisons under typical store lighting is difficult at best. Pay attention to shadow detail, particularly within faces. Look for natural, smooth shadow transitions that don't sacrifice detail in the darkest portions of the image. Plasma displays that claim a 60,000-hour life span (the time until they are half as bright as a new unit) typically use the latest generation of

## NEC 42XR4



This plasma TV doesn't come with many extras, such as speakers and mounting hardware, and its advanced picture controls demand professional setup. But with some tweaking, its accurate and faithful video reproduction is a pleasure for the eyes.

The 42XR4 lacks a television tuner, but that's mostly irrelevant for cable and satellite set-top box users.

Proper calibration, including black-level and color adjustments, transform this relatively good plasma TV into one that grabs your attention with the most impressive, natural-looking imagery I've seen from any plasma TV in its class. More important, the necessary controls are accessible from the user menus.

Yes, the 42XR4 costs more than most other 42-inch plasma displays, but I have yet to see a 42-inch TV come this close to image perfection.

**\$3,995.00 street**

[go.pcmag.com/nec42xr4](http://go.pcmag.com/nec42xr4)

●●●●●

plasma panels. These panels provide a smoother transition between finely graduated light and dark detail than older designs do. Another quick check is with letterboxed movies. If the black bars in the movie appear dark gray instead of inky black, the unit's brightness may be set too high or it may be using older technology.

A good way to start narrowing a list of potential plasma display purchases is to determine the screen size that suits your space requirements and budget. Common plasma display sizes range from 37 inches to 65 inches (screen measured diagonally). Of course, larger displays usually cost more. LCD TVs measuring 65 inches cost twice as much as similarly sized plasma displays.

Resolution is another factor in the cost and image quality of a plasma display. For pixel-based display devices like plasma TVs, native resolution refers to the number of unique pixels provided along the display's horizontal and vertical axes. For displays 50 inches or larger, the native resolution

## STAY AWAY!

### Dell W5001C

Overall image quality in this 50-inch plasma was a disappointment—almost unforgivable in a high-definition display. **\$3,799.00 list**  
[go.pcmag.com/dellw5001c](http://go.pcmag.com/dellw5001c)

●●○○○



matches or slightly exceeds the resolution delivered in a 720p HDTV broadcast signal. The more pixels a display offers for its screen size, the closer to the screen a viewer can sit without noticing the display's pixel structure. For plasma TVs smaller than 50 inches, things get slightly more complicated (see "Debunking Plasma TV Myths").

Another important aspect to consider is integrated features, particularly A/V inputs. Digital video input provides the best image quality with plasma displays, and a connection called HDMI has become the de facto standard. HDMI's primary advantage over DVI (offered on PCs and older HDTVs) is that it can carry audio and video signals over a single connection. Most new plasma displays provide two HDMI inputs, and I advise you not to settle for less. Component video input offers the best image quality among the analog video inputs provided on TVs today. If you want an integrated over-the-air TV tuner or CableCard slot, make sure that the display you are considering offers those features as well.

Where the A/V inputs on a plasma display are located is yet another key consideration. While most provide the A/V connections on the back, some models offer external boxes that incorporate the display's A/V inputs. One advantage of housing the A/V connections in an external box is that the inputs can be located closer to the A/V components that feed into them. Also, external A/V input boxes reduce the number of cables connected to the rear of the display, simplifying cable management. But most plasma displays that have an external A/V input box cost more than the ones with integrated connections.

Finally, consider where you make your purchase. Many online retailers can offer attractive pricing on the latest plasma displays, but unless they are manufacturer-approved resellers, the factory warranty will not be honored. If in doubt, check the manufacturer's Web site or contact the company directly.—RH

## OTHER OPTIONS



### MOST AFFORDABLE Vizio P50 HDM

This is the least expensive 50-inch plasma display we've seen to date. It offers fine overall picture quality and a good selection of A/V inputs at an amazing value.

**\$2,599.99 list**  
[go.pcmag.com/p50hdm](http://go.pcmag.com/p50hdm)  
●●●●○



### MOST PORT OPTIONS Pioneer PDP-5050HD

The display's Media Receiver offers an impressive amount of input options, including three component inputs (one located up front, a rarity), two HDMI, two FireWire, one CableCard slot, and even a front-mounted VGA input.

**\$4,500 street**  
[go.pcmag.com/5050hd](http://go.pcmag.com/5050hd)  
●●●●○

## DEBUNKING PLASMA TV MYTHS

**EVERYONE KNOWS THAT YOU** can't believe everything you read on the Internet. Still, even I am astonished at the number of myths, misunderstandings, and outright lies about plasma TV technology that continue to circulate online. In an effort to educate the public, I've compiled a list of the top plasma television myths.

**Plasma displays leak gas and/or require periodic refilling: False** The pixels of a plasma television are made of permanently sealed glass cells filled with a harmless neon/xenon gas mixture. Plasma displays do not leak, nor do they require maintenance.

**"Burn-in," or permanent image retention: Mostly false** The earliest generations of plasma TVs were prone to phosphor "burn-in," or permanent image retention, if a static image such as a network logo was continuously displayed for long periods. Recent tests reveal that today's plasma TVs can display static imagery for days with no sign of permanent damage.

**Plasma TVs consume lot of energy: False** The National Resources Defense Council (NRDC) stated in a 2005 study that it couldn't identify a single high-definition display technology as the clear "winner" in energy efficiency. As LCDs and Plasma TVs were scaled up in size, the NRDC found that "LCD technology had no consistent efficiency advantage."

At the 2005 Flat Information Displays conference, Panasonic stated that for an average pixel level of 20 percent, plasma TVs consume less power than LCD TVs (using cold-cathode backlights).

**All plasma displays are high-definition: False** Broadcast HDTV is commonly delivered in one of two resolutions: 1,280 by 720 pixels progressive (720p) and 1,920 by 1,080 pixels interlaced (1080i). The smallest plasma displays that offer true HD resolution start at 50 inches (native 720p resolution or slightly greater). The native resolution of panels smaller than 50 inches can range from 852 by 480 pixels (known as "enhanced definition") to as high as 1,024 by 1,024 pixels.

Confusing matters further, a widescreen plasma TV is considered a high-definition display if the vertical resolution is equal to or greater than 720 lines. Thus, 42-inch plasma displays with a native resolution of 1,024 by 768 pixels are considered HD displays even though they will eliminate 20 percent of 720p broadcast's horizontal resolution. □

Robert Heron is PC Magazine's lead analyst for HDTVs.

## RECENT REVIEWS

<b>Panasonic</b> TH-42PX501	\$2,999.95 list	●●●●○	This entry-level plasma provides impressive imagery when playing DVDs.
<b>Maxent</b> MX-42XM11	\$1,999.00 list	●●●●○	Although this display has a pleasing price, image quality could be better.
<b>Dell</b> W4200 HD Plasma TV	\$3,499.00 direct	●●●●○	You get very good image quality on this unit at a competitive price.



### MORE plasma display REVIEWS ONLINE

Check out all our plasma display reviews at [go.pcmag.com/plasma](http://go.pcmag.com/plasma).

12.1-inch widescreen

**Gateway E-100M**

The E-100M is truly a treat to travel with, as long as you don't need to rely on an optical drive for entertainment. This slim beauty doesn't have one.

**\$1,574 direct**  
[go.pcmag.com/gatewaye100m](http://go.pcmag.com/gatewaye100m)



0.8-inch  
magnesium  
alloy

**BEAUTIFUL DESIGN, LOW COST**

**Y**OU DON'T NEED TO SPEND BIG bucks to travel in style. Weighing in at only 3.2 pounds, the Gateway E-100M is slender, sleek, and (unlike other ultraportables) reasonably priced. Although the performance won't rock your world, it's good enough to get you happily through your day.

The high-contrast transreflective display has a resolution of 1,280-by-800 and is ideal for viewing downloaded videos as well as text files and PowerPoint slides. Gateway keeps the keyboard simple, excluding extras like quick-launch keys, speaker grilles, and multimedia buttons. You get the necessities: a full-size keyboard, a touchpad, and a pair of

mouse buttons. The system also includes an 80GB hard drive and a Trusted Platform Module (TPM), which encrypts personal files and passwords.

Perhaps the greatest drawback to the E-100M is its lack of an internal optical drive, though that's how it stays so sleek. Also, the E100M's performance can be slow, as we saw in testing. It uses an Ultra Low Voltage (ULV) Intel Core Solo U1400 (1.2 GHz) and has just 512MB of RAM. The ULV processor's benefits are that it keeps the system cool and allows the tiny, three-cell battery to run for up to 3 hours.

The Gateway E-100M doesn't try to impress you by loading up on a bunch of bells and whistles. But it's ideal for anyone who needs to do basic Office tasks on the go. —Cisco Cheng



## There's always something better about buying local.

Now, when you buy a PC with genuine Windows® XP software from your local PC builder, you get a free **BONUS PACK\*** worth up to \$1,200\*\*. **BONUS PACKS** include valuable products and services like a D-Link® DI-524 wireless router, T-Mobile® HotSpot wireless broadband Internet service, and more. For details, visit [www.localPCbuilder.com/PCMag](http://www.localPCbuilder.com/PCMag). But act now. These offers expire June 30, 2006.

**D-Link**  
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HotSpot

channeladvisor  
**pro**

New Horizons  
Computer Learning Centers  
Columbus, Lehigh Valley, Allentown

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INTERNET PROTECTION

CINEMANOW  
WATCH MOVIES AND MORE

ACCESSLINE  
COMMUNICATIONS

PixelMill™  
the web integration company

Entrepreneur  
MAGAZINE

**Microsoft**

\*For a limited time. Some restrictions apply. See [www.localPCbuilder.com](http://www.localPCbuilder.com) for offer details and conditions. Prices are in U.S. dollars. Offer available for computers purchased in the United States March 1, 2006, through June 30, 2006, from approved system builder channels with a genuine United States Windows XP Home Edition, Windows XP Professional, or Windows XP Media Center Edition operating system preinstalled and validated by the Windows Genuine Advantage program. Offer excludes systems purchased from retailers, major computer manufacturers (OEMs), those purchased as part of a volume license agreement, and those purchasers redeeming outside of the United States. Limit one BONUS PACK per system purchased. Redeem the Buy Local BONUS PACK by August 15, 2006, in the United States.

\*\*Value of BONUS PACK varies depending upon version of Windows XP operating system acquired  
\*While supplies last

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SUPER-SMALL, AFFORDABLE  
MEDIA CENTER

**T**HE NEW HP PAVILION SLIMLINE Media Center s7320n PC has a lot going for it: small size, low price, sufficient power, multimedia capabilities, plus a neat little backup system. It's the perfect computer for the newbie user, as well as a great fit as a second or third PC in a crowded household.

Loaded with features and running Media Center OS, the s7320n has multimedia covered. Its 160GB hard drive offers decent storage space. And Sonic Solutions' DigitalMedia Plus for Media Center is a cool suite of applications that lets you back up your pictures, videos, music, and more onto DVD media for safekeeping. It's simpler and more convenient than using the ordinary Windows-based backup function.

To keep the price down, the s7320n relies on an Intel Celeron M 380 processor running at 1.6 GHz. In testing, this system was a bit slower than its Pentium M counterparts, but not so lethargic as to hinder home computing and basic multimedia challenges.—Joel Santo Domingo



**HP Pavilion  
Slimline Media  
Center s7320n**  
Slim and trim  
yet very  
capable, the  
unassuming Slimline  
Media Center will wow  
you with what it can do.  
Without monitor, \$550  
direct  
[go.pcmag.com/hps7320n](http://go.pcmag.com/hps7320n)



7-in-1 digital  
media card  
reader



Apple warns: "Your  
Windows partition  
will be open to  
virus attacks"

**Apple Boot Camp (Beta)**

This utility has the power to change the PC landscape. It makes buying a new Apple system appealing to PC users—diehards as well as newbies.  
**Free download**  
[go.pcmag.com/applebootcamp](http://go.pcmag.com/applebootcamp)  
Not rated.

APPLE BOOT CAMP,  
BENCHMARK TESTED

**A**PPL E RUNNING MICROSOFT Windows is probably the biggest tech news, since, oh, Apple started using Intel processors. Apple Boot Camp (Beta) is an Apple utility that lets you dual-boot your Mac with the Mac OS and Windows. Apple does a good job of walking you through the installation, and the entire process takes less than an hour. Some features, such as the iSight camera, don't work when Windows is running, but the system runs smoothly.

To prove how well, my Labs cohorts and I played a successful Doom 3 deathmatch over a LAN using three Intel Macs running Windows. We set up the Mac mini as the game server, and both the MacBook Pro and the iMac were used as clients. We even threw a Velocity Micro NoteMagix M57 Ultra, a Windows-based notebook, into the three-player setup—a first for Macs.

Considering that Macs traditionally can't run Doom 3, the gaming test results are impressive. On the MacBook Pro, Doom ran at 38.6 fps under Windows. When we dropped the resolution to 640-by-480, the iMac was able to play Doom at a smooth 93 fps. (You can find the test results at [go.pcmag.com/applebootcamp](http://go.pcmag.com/applebootcamp).)

Boot Camp goes live with Leopard, the next Mac OS release, sometime next year.—Cisco Cheng



## NIMBLE CONVERTIBLE FOR ROAD WARRIORS

**T**HE NEW TOSHIBA PORTÉGÉ M400-S933 (\$1,699 direct) will appeal to those looking for a small laptop with both tablet capabilities and a built-in optical drive.

The M400 is wrapped in a sturdy magnesium alloy. Tipping the scales at 4.7 pounds, it's light for a notebook but slightly heavy for a tablet—that's due in part to the internal DVD/CD-RW combo drive. Writing with the tablet's pen felt very comfortable, and typing on the smallish keyboard was okay but took some practice. Switching the M400's 12-inch screen between laptop and tablet PC modes is simple.

For added security, the M400 comes equipped with a Trusted Platform Module (TPM), a hardware component on the motherboard that can encrypt and protect passwords and documents. An integrated fingerprint reader lets you input passwords with a quick swipe. The M400 is powerful enough to run your typical business programs successfully, and all in all, it's a very capable tablet notebook. —Cisco Cheng

Swivel to convert  
to tablet



### Toshiba Portégé M400-S933

Though loaded with all the features you'd expect, the M400 is compact and lightweight, and it handily converts to tablet mode on the fly. \$1,699 direct  
[go.pcmag.com/toshibam400](http://go.pcmag.com/toshibam400)

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## A NO-FRILLS DISPLAY

**O**NE OF THE MORE AFFORDABLE 20-inch LCD monitors available, the Envision EN2028 can be had for under \$600. It does, however, suffer from unsatisfying performance in some key areas.

The EN2028's 1,600-by-1,200 panel looks really sharp in its black case with ultrathin bezel. Function buttons provide access to the on-screen display. They also let you quickly change brightness levels and adjust the clock, focus, and vertical and horizontal position settings.

Overall motion performance is adequate and will satisfy most casual users. Die-hard gamers should be wary, as the benchmark tests revealed moderate ghosting and artifacts in fast-motion sequences. The monitor also had trouble rendering shades of light gray in analog mode, but this flaw doesn't affect the panel's overall image quality. Text was sharp at 6.8 points but became garbled at smaller sizes.

Envision's warranty is somewhat stingy: It covers parts and labor for three years, but the actual panel and backlighting are covered for only one year.

Better-performing LCDs that offer more features are out there, but they also cost more. If you're on a budget and you want a 20-inch LCD, the EN2028 is a good bet. —John Delaney



### Envision EN2028

This 20-inch LCD monitor is a solid package at a reasonable price, despite a scaled-back feature set and slight performance drawbacks. \$500 street  
[go.pcmag.com/en2028](http://go.pcmag.com/en2028)

●●●●○

Adjustable height  
and tilt, but no  
swivel or pivot

BUYING GUIDE

# Media Center Laptops



## TOSHIBA QOSMIO G35-AV600



The long-awaited Toshiba Qosmio G35-AV600 boasts the most complete set of A/V features on the market. I loved the Qosmio when it first appeared, and now, with the Intel Core Duo processor, a fingerprint reader, and intuitive touchpad controls, it's still my favorite Media Center laptop.

The AV600 isn't for frequent travelers. Its 9.9-pound bulk is due primarily to the intensely bright 17-inch widescreen display. Multimedia buttons provide easy access to DVD controls and television recording, and Toshiba's instant-on feature lets you watch live TV or play DVDs without booting into Windows. The sound quality is amazing for a notebook. And when HD DVD goes final, it will show up in this laptop first. What more could you want from an A/V

Media Center laptop? —Cisco Cheng

[go.pcmag.com/toshibag35av600](http://go.pcmag.com/toshibag35av600)

\$2,399.99 direct



Ports for  
connecting  
your VCR, Xbox,  
or camcorder

Application launcher  
built into touchpad

## STAY AWAY!

### Fujitsu LifeBook N6410

This big Media Center has some nice features, but it can't compete with other 17-inch notebooks in terms of performance.

\$2,449 direct  
[go.pcmag.com/fujitsun6410](http://go.pcmag.com/fujitsun6410)



**I**N ADDITION TO BEING CAPABLE PCS, Media Center notebooks are extremely talented multimedia hubs that are great for organizing and storing your photos, music, movies, and home videos. You can even use this new breed of portable to watch and record live television. Part of the magic is done through Windows XP Media Center Edition 2005 (MCE 2005), the OS running on these machines, but there are more features to examine.

Of course, you'll need to settle on a price you can live with. A good example of a high-end Media Center laptop is the Toshiba Qosmio G35-AV600

(\$2,399.99 list), our Editors' Choice winner. On the value-priced side is the Dell M170, which can be had for as little as \$749.

When shopping for a Media Center laptop, several elements should factor into your decision. First, choose one with a bright, high-contrast screen, also known as a transreflective, or glossy, display. Companies have proprietary names for this screen technology: Sony's XBrute, Dell's UltraSharp, and Acer's CrystalBrite. Designed with TV and movie viewing in mind, these screens tend to generate a greater amount of glare than standard TFT displays. While this is not a problem when catching the latest DVD,



## EXPERT VIEW

BY CISCO CHENG

it could be potentially annoying if you're using your computer outdoors or under bright fluorescent lights. As for screen size, you want something with a widescreen, and 15.4 inches (measured diagonally) is a good starting size. Keep in mind that big wide-screen displays tend to make notebooks heavy—usually 7 to 10 pounds. That's quite hefty compared with ultraportables, which usually weigh in at 4 pounds or less.

Video and photo files tend to fill up your hard drive quickly, so get a notebook with plenty of storage space. A 100GB hard drive is the largest I've seen so far. When selecting your optical drives, choose a dual-layer DVD burner capable of recording twice as much as a single-layer DVD burner.

Most Media Center PCs have various video and audio connections. At some point, you may want to attach a cable box, home theater system, or even an Xbox 360 to your laptop. Look for composite-in ports, such as A/V (red, yellow, white) or S-Video-in ports for video. The advanced Toshiba Qosmio G35-AV600 even has component-out ports, which will let you display content from your notebook to a larger flat screen, such as a plasma TV or a Texas Instruments DLP (Digital Light Processing) projector. To pump high-quality audio directly to home theater and surround-sound receivers, some Media Center laptops come equipped with S/PDIF digital audio-out ports as well.

Many Media Center laptops also let you quickly access and play DVDs, CDs, and audio files stored on the hard drive without booting Windows (though some non-MCE machines can do this as well).

And what's a media laptop without a TV tuner? Some machines have built-in TV tuners, but these systems tend to cost more than \$2,000. A less expensive option is to buy an ExpressCard TV tuner upgrade, which works well but can be bulky. Remember that not all Media Center laptops (or desktops for that matter) come with a TV tuner, as they once did. So make sure you investigate the features before you buy any laptop. —CC

## OTHER OPTIONS



**TV TO GO**  
**HP Pavilion dv5000t**  
This elegantly designed multimedia machine runs fast Intel Core Duo components and has magnificent battery life. \$1,964 direct [go.pcmag.com/hpdv5000t](http://go.pcmag.com/hpdv5000t)  
●●●●●

**YOUR AV HUB**  
**Acer Aspire A59504WSMI**  
Acer's Media Center laptop offers a broad selection of A/V connections and a blend of unique features. \$2,200 street [go.pcmag.com/aceras9504wsmi](http://go.pcmag.com/aceras9504wsmi)  
●●●●●

**POWER TO PLAY**  
**Dell Inspiron E1705**  
You get plenty of performance, thanks to an Intel Core Duo processor, a robust 3G graphics card for gaming, and an optional USB TV Tuner. \$2,307 direct [go.pcmag.com/delle1705](http://go.pcmag.com/delle1705)  
●●●●●

## I LOVE MY MEDIA CENTER TV

**A** S A MEDIA JUNKIE, I'M ALREADY excited about what Media Center laptops offer. My ideal setup is a portable system that can store and play back all my videos, TV programming, music, and photos—all with the simple press of a remote button. And I love that my laptop with TV tuner can double as a TiVo-style recording device. But what's coming down the line is what really excites me.

TV tuners and other A/V features tend to come in laptops that are large by design, usually featuring a 15.4-inch to 17-inch widescreen. If you're a frequent traveler, a desktop laptop like this may not be for you. But I expect designs to get thinner and lighter as Media Center PCs evolve, and it won't be long before these powerful A/V features appear in a 4-pound ultraportable.

Imagine watching high-definition (HD) content on your laptop. It's not really a pipe dream, and it won't be long before you see a number of portables touting higher resolutions, ranging from 1080i (interlaced) to—dare I say it?—1080p (progressive).

I've seen Media Centers that can record HD content using over-the-air HD tuners, despite the limited availability of high-definition broadcast channels. Toshiba is already integrating HD DVD drives into its Qosmio laptops sold in Japan. For now these drives are just readers; they'll have HD DVD burners at a later date. Toshiba is doing it this way because of the lack of HD media available to the public. Similarly, Sony recently announced plans to put Blu-ray drives into its PCs. Look for these manufacturers to include HDMI ports as well, so that home theater enthusiasts can connect their laptops to larger LCDs or plasma displays that are compliant with HDCP (High-bandwidth Digital Content Protection).

I'm miffed, though, about HDCP and HD copy-right protection, which is slowing down the availability of both high-definition DVD content and HD DVD and Blu-ray drives in notebooks. Vendors are still trying to figure out how to protect HD content from piracy, which also explains the hold-up.

Once the powers that be figure this out, you'll be able to buy MCE notebooks with satellite/cable boxes or, ideally, with CableCard slots built right in, and then watch HBO and ESPN in high definition. This will drastically change Media Center notebooks and the way we watch TV—for the better. □

Cisco Cheng is PC Magazine's lead analyst for notebooks.

## RECENT REVIEWS

<b>HP Pavilion dv5000z</b>	\$1,636.00 direct	●●●●●	Powered by an AMD Turion 64 processor. Swift, and has a big hard drive.
<b>Dell XPS M140</b>	\$749.00 direct	●●●●●	Affordable and lightweight. Great battery life, but no TV tuner.
<b>Gateway NX850XL</b>	\$2,899.99 direct	●●●●●	A powerful MCE laptop that handles multimedia tasks and games equally well.



### MORE NOTEBOOK REVIEWS ONLINE

Check out all our laptop reviews at [go.pcmag.com/laptops](http://go.pcmag.com/laptops).

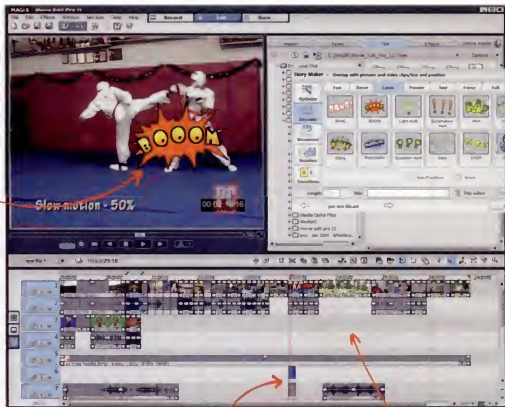
Cartoony overlays  
add a comic touch  
to home movies

#### Magix Movie Edit Pro 11

If pushing the creative envelope is a top priority—and usability isn't—you might like Magix Movie Edit Pro 11. Otherwise, stick with something more straightforward.

\$59.99 direct  
go.pcmag.com/  
magixmovieeditpro

●●●○○



Dragging "boom"  
from library to  
timeline inserts  
the overlay

16-track editing  
enables flexible  
moviemaking

### LIGHTS, CAMERA, CONFUSION

**M**AGIX MOVIE EDIT PRO 11 IS A fast-performing video editor with a fine range of effects, but casual users will find the cryptic interface frustrating.

If you have lots of patience and want to push the envelope, give it a spin. If you want quickly produced, attractive DVDs, though, stick with Adobe Premiere Elements.

Still, Movie Edit Pro (MEP) has more effects than Elements does, as well as more effective color correction and brightness controls. The product also supplies tools you won't find in Elements, such as image stabilization (which works well), scene detection for imported video, and a feature that lets you display the date you shot your footage. The

software showed some additional advantages during my testing: It was faster at encoding MPEG-2 video and didn't produce as much flicker during pan and zoom.

Nonetheless, several features still trail those of Elements. For example, Elements produced a higher-quality chroma key and smoother slow motion on my tests. Elements also provides better tools for correcting backlit videos, better templates, and, most important, more intuitive authoring. To adjust still positioning and pan-and-zoom effects in MEP, you might need to use as many as four tools versus one in Elements. The less-than-intuitive authoring makes figuring MEP out—and trying to remember your process—a constant frustration.—Jan Ozer

#### MORE ON THE WEB

For in-depth looks at DVD authoring tools, visit go.pcmag.com/dvdauthor06.

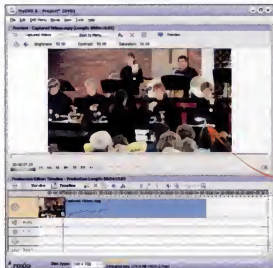
## IT'S NEW! IT'S WORSE!

**I**N SOME WAYS, ROXIO MYDVD 8 PREMIER improves on the previous product. To MyDVD's fine authoring tool, Sonic Solutions has added a Project View that lets you navigate through work in progress. And slide show functions now enable pan and zoom, color adjustment, and more. The software also retains some previous strengths, such as the ability to create submenus, letting you build disc navigation systems that even Adobe Premier Elements 2.0 can't touch. All worked well on my tests, as did loading DivX files and low-res digital-camera videos. One-step DV-to-DVD conversion was easy, and quality is good. There's even TiVo support.

Overall, however, the product disappoints. You now edit in Roxio VideoWave, which handles more audio tracks than the previous editor and has some advanced effects-processing tools, but it trails editors such as Adobe Premiere Elements. You can't, for example, apply multiple effects to a video clip. Workflow tools have also suffered. Now you must manually insert captured clips, and HDV requires conversion to a format that MyDVD can import.

Sonic has enhanced some menu creation tools, but others, like the previous version's grid alignment feature, are missing, and you can no longer create DVDs that let viewers see multiple videos without returning to the menu after each. Worse, there's no auto-save, so when the app crashes (not unusual for this type of app), you lose work. And this version doesn't support projects created with previous versions.

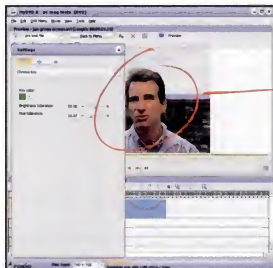
Unless you need single-step tape-to-DVD conversion, you'll find MyDVD 8 Premier less than a blockbuster.—JO



### Roxio MyDVD 8 Premier

New doesn't always mean better. Despite some improved video-editing features, the DVD authoring tool takes a step back. **\$69.99 direct**  
[go.pcmag.com/dvd8premiere](http://go.pcmag.com/dvd8premiere)  
 ●●○○○

Capture and produce a DVD from hi-def HDV footage



Crude chroma key tools leave green around edges

**THE WINNER AND STILL CHAMPEEN!** Adobe Premier Elements 2.0 scored an Editors' Choice for consumer-level video editing when we reviewed it in our issue for November 22, 2005, and it maintains the title. For authoring DVDs, it's quite flexible—you can add still or video backgrounds to all menus, animate and change the location of any menu button, and change the font, size, color, and location of titles and text buttons. Given its lineage—Premiere Pro—I expected the exceptional power, but I also found Elements 2.0 surprisingly usable (although not as intuitive as Pinnacle Studio). And of course, you get plenty of editing capabilities. It lacks an audio mixer, and Pinnacle Studio remains a better choice for simple home movies. But if you're seeking a highly capable, inexpensive program for ambitious projects, Premiere Elements 2.0 is the way to go.—JO



### Adobe Premier Elements 2.0

For heavyweight movie projects, this inexpensive software is a knockout.

**\$90 street**  
[go.pcmag.com/elements2premiere](http://go.pcmag.com/elements2premiere)  
 ●●●○○



## FEED YOUR NEED FOR RSS

**W**HY SHOULD YOU BUY A Windows aggregator/reader for RSS feeds (automatically delivered Web content updates) when lots of free ones exist? Because FeedDemon 2.0 is comprehensive, feature-rich, and intuitively

organized. Attensa for Outlook is the only challenger I've seen that even comes close.

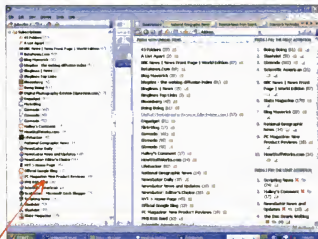
This latest version of FeedDemon displays a single-level, Explorer-like "tree view" of your feeds (called *channels* here) rather than the drop-down list of its predecessor, and keeps track of those you read or interact with the most, helping you sort and prioritize. Have a free account with NewsGator Online (a service for viewing feeds from any browser on any Internet-connected PC)? FeedDemon syncs with it seamlessly, organizing feeds as they are on your PC and marking those you've already read—a big benefit.

FeedDemon combines amazing simplicity and flexibility, letting you easily organize, sort, and share feeds, subscribe to new ones, and generally manage everything from within a single interface. If you can't live without RSS and don't want to tease your feeds from an Outlook add-in or a browser, the \$29.95 FeedDemon 2.0 is a bargain.—*Davis D. Janowski*



### FeedDemon 2.0

Behind the pretty (inter-)face, this RSS reader/aggregator has smarts that help you organize your RSS feeds. \$29.95 direct [go.pcmag.com/feedemon2](http://go.pcmag.com/feedemon2)



A single-tree view of all your feeds

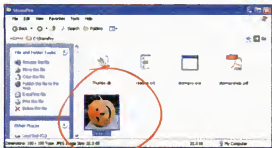
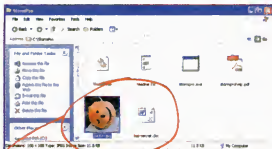
See which feeds you read the most...and least

### Storm Pro

This clever little app hides data that you want to keep secret by placing it within other files—a technique known as steganography. \$9 direct [go.pcmag.com/stormpro](http://go.pcmag.com/stormpro)



The secret Microsoft Word doc and the JPEG it'll hide in



The Word doc's gone & the JPEG has doubled in size

## HIDE IN PLAIN SIGHT

**S**TORM PRO SHOULD APPEAL TO James Bond wannabes and those with serious secrets. Rather than encrypting secrets, it hides them, embedding small sensitive files inside large media files. The media files remain functional, with no indication that they include extra data.

Storm Pro has almost no user interface. To merge data and media files, hold down the Shift key while double-clicking on the Storm Pro executable; to split them, hold down the Ctrl key, too. Add CapsLock to either process and the app prompts for a password. If you e-mail the media file to a friend, it looks like any photo, movie, or song. A free downloadable edition of Storm Pro can extract the secret data if you transmit the password, too.

Storm Pro hides data in media file formats whose headers map out their data, such as JPEGs and MP3s. But I reverse-engineered the way the file was hidden in 20 minutes and could easily write a program to extract it. Therefore I strongly recommend using the optional password protection, which I couldn't break. But don't forget the password, or your secret data will remain hidden, even from you—permanently.—*Neil J. Rubenking*

Lithium ion battery  
rechargeable via USB

# As Levees Rise Near New Orleans, Skepticism Falls

## Red Cross Plans Changes After Hurricane Problems

A truce, of sorts,  
between the Army  
Corps of Engineers  
and its critics.

Rollers allow for  
smooth scanning

## A MAGIC-WAND SCANNER

**W**HETHER AT PLANON WAS responsible for calling the DocuPen RC800 a pen scanner did the product a tremendous disservice. Not only does the DocuPen not look like a pen, it doesn't work like a typical pen scanner, either. And that's a good thing.

Typical pen scanners tend to be thin with a small scan element at the tip. This unfortunate design makes scanning a large amount of text tedious because you scan only one line at a time—much like using a highlighter. And if your hand tends to wander above or below a line, as mine does, you have to rescan the entire line.

Mercifully, none of this applies to the RC800. The scan element runs nearly the whole width of the scanner's 8.9-inch-long body. You simply lay the scanner flat across the top of the page, and rollers above and below the scanning element make it easy to sweep smoothly from top to bottom. It took me just two tries before I could reliably scan a full page correctly.

The RC800 comes with 8MB of transflash memory, which seems skimpy, but it can hold hundreds of low-res monochrome text pages. In testing, scanning was successful. Scans of high-resolution color photos weren't bad either, but not sharp enough to pass as originals. It comes in seven colors and with a protective leather case. —M. David Stone



**DocuPen RC800**  
Those in need of a mobile scanner for digitizing documents quickly are in luck. The DocuPen RC800 from Planon is the best transportable scanning tool we've seen.  
**\$299.99** direct  
[go.pcmag.com/planonrc800](http://go.pcmag.com/planonrc800)  
●●●●●

## FIRST LOOKS

SMALL BUSINESS

Scans to e-mail

### Konica Minolta PagePro 1390 MF

This monochrome laser is small, lightweight, and a reasonable fit for a small office, but there are better all-in-one personal lasers out there.

**\$349.00** direct  
[go.pcmag.com/konica1390mf](http://go.pcmag.com/konica1390mf)

●●●○○



## MULTITALENTED IN THEORY, NOT IN PRACTICE

**W**ITH THE ABILITY TO PRINT, scan, make copies, and fax paper documents, the Konica Minolta PagePro 1390 MF sure is a handy all-in-one monochrome laser printer. Too bad it has a few annoying flaws, which hold it back from getting a stronger recommendation.

The 1390 MF is compact, maybe even cute, and should easily squeeze into a tiny home office or departmental cube. Speed is this printer's strong point; unfortunately, the 1390 MF drops the ball when it comes to output quality. Though most fonts looked okay in testing, the printer had problems with a stylized font with heavy strokes: It merged characters together into a messy solid block of text, even at 12 points. This is unheard of, and unacceptable, for a laser printer. Another defect is that the 1390 MF can't fax electronic documents. Instead, you must print out a hard copy and fax it the old-fashioned way.

Ultimately, the Konica Minolta PagePro 1390 MF is a decent monochrome all-in-one, but its shortcomings give me pause.—*M. David Stone*

ADF for faster  
printing

## LOW COST, LIGHT DUTY

**L**OW-COST MONOCHROME LASER printers are specifically targeted at small (very small) offices and home offices that don't print a lot of pages. With an input tray capacity of only 150 sheets, the Samsung SCX-4521F isn't equipped to handle high printing demands. But just because you don't need a heavy-duty printer doesn't mean you don't need all the functions of an all-in-one. The SCX-4521F can print, scan, fax, and make photocopies. As is common with light-duty AIOs, however, it has no network connection.

The SCX-4521F's print speed is on target for its price, and its output quality, according to our benchmark tests, is good enough for most purposes. Although text quality is a touch below average, most fonts are clear at 5 points and larger. Graphics quality is typical for monochrome lasers: good enough for internal business use but showing too much dithering to impress a client. Photo quality is adequate for an office or family newsletter or for printing out Web pages.—*MDS*



### Samsung SCX-4521F

This monochrome laser is compact enough to fit comfortably on a desk. It's a viable low-cost option for a small or home office with a light printing load.

**\$250** street  
[go.pcmag.com/samsung4521f](http://go.pcmag.com/samsung4521f)

●●●○○

# BUFFALO

## Test Your Limits

## NFINITI

Buffalo's AirStation Nfiniti™ wireless solutions deliver ultimate connectivity across your wireless world for the broadest coverage at blazing fast speeds. Designed to stream high-definition (HD) video, music, media and gaming, Nfiniti gives you infinite possibilities to test the limits of your wireless network. Combine 2-in-1 Nfiniti Wireless Router & Access Point WZR-G300N with Nfiniti Wireless Notebook Adapter WLI-CB-G300N or Nfiniti Wireless Desktop PCI Adapter WLI-PCI-G300N and get the ultimate bandwidth, range and reliability for your wireless world!

Best of Both Worlds - Ultimate Range at Blazing Speeds

Built for High-Definition Media Streaming - Wirelessly!

Easy and Secure Setup with AOSS™

Designed to IEEE802.11n Draft Standard Specifications

### DRAFT-N



WZR-G300N

To learn more about Buffalo Nfiniti™ products,  
go to [www.buffalotech.com/pcmag-nfiniti](http://www.buffalotech.com/pcmag-nfiniti)

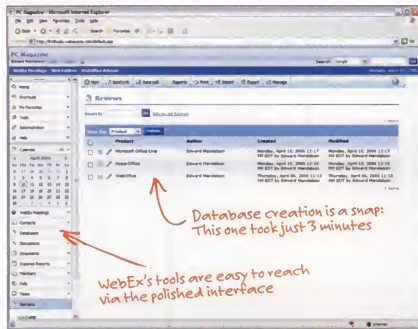
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## BUYING GUIDE

# Online Collaboration Services



## WEBEX WEBOFFICE



WebEx successfully brings the solid skills it developed for its online meeting services to the collaboration space, achieving impressive results. This sleek, fast, and highly customizable service offers easy-to-create custom databases, excellent document management, and even integration with its Meeting Center service (which requires a separate subscription). The only drawback is a lack of integrated e-mail (you can send but not receive)—a hole that should be filled soon. The product is so mature that getting started with the collaboration tools and using them is a breeze.

Up to 5 users, \$59.95 per month (\$49.95 for nonprofits)  
[go.pcmag.com/webexweboffice](http://go.pcmag.com/webexweboffice)  
 ●●●●●

ONLINE COLLABORATION TOOLS LET you and your coworkers log on to a Web site to share all the information you normally access on desktop computers, breaking the ties that bind you to a specific location. To share files such as Word documents, spreadsheets, Web links, contact lists, and calendars, you can use any computer that has a current browser. These services also bring together communications tools you usually access through separate apps or a variety of Web sites—e-mail and discussion apps, for example. There are certainly other ways to share content and collaborate, but none are easier to set up or cheaper.

Of course, putting your company's data in outside hands is a critical consideration. Our Expert View (facing page) can help you balance the pros and cons. That said, you can't tell whether a service is for you without trying it. Those we examined don't require a huge amount of initial setup, so take advantage of the free trials or public beta periods.

With many of these services, when you sign up, you choose a name (typically your company's) that becomes part of your site address—one of ours was [firstlooks.typical-collaboration-service.com](http://firstlooks.typical-collaboration-service.com), for example. Employees go to that address and log on with individual usernames and passwords.

Microsoft's Office Live service is different: Each worker associated with your company visits

## HOW THEY RATE

	Minimum monthly price
HyperOffice	\$17.99 for 2 users
JotSpot	\$9.95 per user
Microsoft Office Live Beta	\$29.95 up to 10 users*
WebEx WebOffice	\$59.95 up to 5 users
Writely.com	free

RED denotes Editors' Choice

**MORE ON THE WEB**  
 For more in-depth reviews of online collaborations tools, visit us on the Web at [go.pcmag.com/onlinecollaboration](http://go.pcmag.com/onlinecollaboration)





## EXPERT VIEW

BY EDWARD MENDELSON

office.live.microsoft.com and logs on using a Passport-enabled mail address created for your company and associated with the service. Office Live's services also include optional free Web hosting at an address based on your own company name—for example, [firstlooks-pcmagazine.com](http://firstlooks-pcmagazine.com).

When you log on to a collaboration site, you see a menu of tools and, in some cases, a summary of the day's calendar. Depending on the service, you'll be able to access contact lists, task lists, company announcements, document storage, discussion groups, polls, Web mail, saved links to remote Web sites, and business applications.

Typically, you work on a collaboration site as you do with applications on your desktop machine, although obviously there are some differences.

First, everything takes longer, even with an enterprise-level high-speed Internet connection. That's because the slightest change—correcting a name in your contacts list, say—requires a page to be downloaded to your browser, uploaded to the server with the new info, then reloaded by your browser so that you can view the corrected data. Still, given a broadband connection, the delays aren't too bad.

Second, most of the services lack the keyboard shortcuts that power users rely on, so you have to use the mouse for navigation or press the Tab key multiple times to reach items you want. Microsoft Office Live offers a set of quick-access keys using Alt-1, Alt-2, and so forth, but they're far too limited and don't always work reliably.

Third, since your data is stored on someone else's servers and you can get to it only over the Internet, you have to synchronize the remote data store with your e-mail client—Outlook, for example—beforehand. That requires advance planning and either add-on software or complex procedures.

Finally, you'll have to rely on your online collaboration service for backups. None that we tested offer a way of backing up remote data to your local machine, so keep local copies of all critical data. —EM

## OTHER OPTIONS

### COMPANY-WIDE WIKI JotSpot

Slick-looking low-cost Wiki app. Optional collaboration and personal to-dos. Requires little training. From \$9.95 monthly [go.pcmag.com/jotspot](http://go.pcmag.com/jotspot) ●●●●○

### WORDS ONLY Writerly beta

Full-featured online word processor. Better than those in online collaboration tools, but does nothing else. Closed to new users at press time but worth waiting for. Free [go.pcmag.com/writelly](http://go.pcmag.com/writelly) ●●●●○

### OFFICE SUITE HyperOffice

Fast, elegant. Full office suite, but no expense or project management. Iffy doc handling. From \$17.99 monthly [go.pcmag.com/hyproffice06](http://go.pcmag.com/hyproffice06) ●●●●○

### BUSINESS MANAGER MS Office Live Beta

Basic features easy; advanced, confusing. Free Web-hosting. Over 20 sample database apps. Customer access to apps you create. From \$29.95 monthly [go.pcmag.com/officelivebeta](http://go.pcmag.com/officelivebeta) ●●●●○

## WHAT'S YOUR RISK TOLERANCE?

**A**RE ONLINE COLLABORATION tools the way to go? I was impressed by the technical prowess these services displayed, but I'm reluctant to trust my data to any of them—partly because of their rough edges and partly because there's no way to know who's behind the glossy interface, which unnamed third parties are involved, or how well your data is protected.

Collaboration services are undoubtedly handy. For example, there's no need to set up a Web server running a costly Microsoft Office or Lotus Notes installation. Users can sync desktop mail contact lists with the online versions and get to the lists—as well as to posted documents and data—from anywhere. The services also enable discussions and polls.

But how secure is your data? Those who choose Microsoft Office Live can be pretty certain their information will be in the hands of a company that will do its best to keep their data safe, but this particular company's best hasn't always been that impressive where security is concerned. On the other hand, with lesser-known rivals you're making a leap of faith. New outfits die all the time, and the one you choose could disappear without notice, taking your data with it.

One problem, although isolated, made me uneasy about these services. For a full day, an ad that was designed to look like an analyst's report but was actually an infamous penny-stock scam was the lead news item on HyperOffice's log-on page. Although the ad was labeled as such, the lettering was tiny, and no reputable news source would have accepted the promotion. HyperOffice said it had no control over the third-party news feed supplying the ad—small comfort.

Whether you should use such a service depends on your risk tolerance. If your data absolutely can't fall into unfriendly hands, think twice. Otherwise, consider such services but back up important data—and never post data like customer credit card numbers online.

The best approach? Use online collaboration convenience features when security and reliability aren't crucial. Joining discussion groups, checking for company announcements, and viewing calendars are pretty safe. Sharing noncritical documents such as press releases makes sense (but consult our reviews for details on how these sites handle document management).

All of these services are worth a try. Whether any are worth the cost is something you'll have to decide for yourself during their free trial or beta periods. □

Edward Mendelson is a contributing editor of PC Magazine.

Contacts/tasks	Document management	Collaboration tools	Business tools	Ease of use	Overall
●●●●○	●○○○○	●●●○○	●○○○○	●●●●○	●●○○○
●●○○○	N/A	●●●○○	N/A	●●●●○	●●○○○
●●○○○	●●●○○	●●○○○	●●●○○	●●○○○	●●○○○
●●○○○	●●●○○	●●●○○	●●●○○	●●○○○	●●○○○
N/A	●●●○○	●●○○○	N/A	●●●○○	●●○○○

N/A—Not applicable. This service does not have this feature. \*Price is for collaboration. Web hosting only, without collaboration, is free.

# THE BEST STUFF

EDITORS' CHOICES IN KEY CATEGORIES



## MEDIA CENTER LAPTOP

**Toshiba Gossio G35**  
17-inch display. Multi-  
tude of AV ports and  
connectors. \$2,399  
direct Toshiba America  
Information Systems Inc.  
[go.pcmag.com/  
toshibaG35](http://go.pcmag.com/toshibaG35)

## MOBILE PHONE (SPRINT)

**Sprint Power Vision  
MM-A940**  
Vast feature set. Optical  
zoom lens. Bluetooth.  
Good game perfor-  
mance. \$399.99 direct  
Samsung Electronics  
America Inc.  
[go.pcmag.com/mma940](http://go.pcmag.com/mma940)

## SMART PHONE (KEYBOARDLESS)

**T-Mobile SDA**  
Wi-Fi. Dedicated  
music buttons. Excel-  
lent screen. Syncs with  
Outlook. \$299.99 direct  
T-Mobile  
[go.pcmag.com/sda](http://go.pcmag.com/sda)

## LOW-COST HDTV (LCD)

**Proview RX-326**  
Pleasing picture quality.  
Consistent image quality  
with analog and digital  
video inputs. \$949.99  
list Proview Technology  
Inc.  
[go.pcmag.com/  
proviewRX326](http://go.pcmag.com/proviewRX326)

## ALL-PURPOSE PRINTER

**HP Officejet Pro K550  
Color Printer**  
Super-fast performance.  
Suited for small office  
or home office. \$199  
street Hewlett-Packard  
Development Co.  
[go.pcmag.com/hpK550](http://go.pcmag.com/hpK550)

## MP3 PLAYER (HARD DRIVE)

**Apple iPod 30GB**  
Great audio quality.  
Intuitive interface. Works  
well with iTunes. Plays  
videos. 30GB, \$299 di-  
rect; 60GB, \$399 Apple  
Computer Inc.  
[go.pcmag.com/  
ipod30GB](http://go.pcmag.com/ipod30GB)

## LAPTOP

**Lenovo ThinkPad X60s**  
Just 3.5 lbs. More than  
7 hours of battery life.  
Integrated EV-DO.  
Excellent screen and  
keyboard. \$2,299 direct  
Lenovo Group Ltd.  
[go.pcmag.com/  
lenovoX60s](http://go.pcmag.com/lenovoX60s)

## DESKTOP

**HP Pavilion Media  
Center TV m7360n PC**  
Dual-core processor.  
TV tuner. Media Center  
PC. Massive amounts of  
storage. \$1,610 direct;  
without monitor, \$1,200  
Hewlett-Packard Devel-  
opment Co.  
[go.pcmag.com/  
hpM7360n](http://go.pcmag.com/hpM7360n)

## FLASH DRIVE

**Memorex U3 Smart Mini  
TravelDrive**  
Great mix of storage ca-  
pacity, U3 applications,  
and security features.  
256MB, \$34.99 list  
Memorex Products Inc.  
[go.pcmag.com/  
memorexdrive](http://go.pcmag.com/memorexdrive)

## PARENTAL CONTROLS

**Safe Eyes 2006**  
Robust. Effective. Stops  
even the most inventive  
kids from hacking their  
way to harm. \$49.95  
per year, up to three  
computers SafeBrowse.  
com Inc.  
[go.pcmag.com/  
safeeyes2006](http://go.pcmag.com/safeeyes2006)



## PORTABLE SCANNER

**Planon DocuPen RC800**  
Pocketable. Scans with-  
out a computer. Built-in  
memory holds hundreds  
of monochrome scans.  
\$299.99 direct Planon  
Systems Solutions Inc.  
[go.pcmag.com/  
planondocupen](http://go.pcmag.com/planondocupen)

## ANTISPYWARE

**Spyware Doctor 3.5**  
The best version yet.  
Removed more spyware  
than other tested prod-  
ucts. \$29.95 direct  
PC Tools  
[go.pcmag.com/spydoc35](http://go.pcmag.com/spydoc35)

## UTILITY

**Altiris Software Virtual-  
ization Solution 2.0**  
Virtualizes software  
installations. Can reset a  
corrupted program to its  
just-installed state.  
free for personal use  
Altiris Inc.  
[go.pcmag.com/altirisvsv](http://go.pcmag.com/altirisvsv)

## NETWORK ATTACHED STORAGE

**Infrant ReadyNAS NV**  
Well-constructed,  
high-capacity device.  
Has intelligent features  
normally found only in  
more expensive models.  
\$1,300 street Infrant  
Technologies Inc.  
[go.pcmag.com/  
readynasnv](http://go.pcmag.com/readynasnv)



## DIGITAL CAMERA (D-SLR)

**Olympus E330**  
Live View display.  
Articulating screen.  
Good image quality.  
\$1,100 list Olympus  
America Inc.  
[go.pcmag.com/e330](http://go.pcmag.com/e330)

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[go.pcmag.com/guides](http://go.pcmag.com/guides)

# Maximum System Performance

## Getting To The Bottom Of Common Reliability Problems

As an IT Professional, you know the importance of maintaining system performance and reliability. If the desktops or servers crash, slow down or freeze, who gets called? That's right...you or your IT staff. This "break-fix" cycle leaves you little time to be proactive. And yet, many of these issues stem from a single, hidden source.

### Reliability issues commonly traced to disk fragmentation.

The most common problems caused by file fragmentation are:

- **Crashes and system hangs/freezes**
- **Slow boot times and boot failures**
- **Slow back up times and aborted backup**
- **File corruption and data loss**
- **Errors in programs**
- **RAM use and cache issues**
- **Hard drive failures**

Having files stored contiguously on the hard drive is a key factor in keeping a system stable and performing at peak efficiency. The moment a file is broken into pieces and scattered across a drive, it opens the door to a host of reliability issues. Even a small amount of fragmentation in your most used files can lead to crashes, conflicts and errors.

(GET THE PROOF HERE:  
[www.diskeeper.com/paper](http://www.diskeeper.com/paper))

### The weak link in today's computers

The disk drive is by far the slowest of the three main components of your computer: CPU,

### Top 5 reasons customers use Diskeeper

Performance and Reliability

83%

"Set It and Forget It" operation

83%

Much superior to built-in defragmenter

44%

Longer systems life with less maintenance

44%

Fast back-ups and antivirus and/or spyware scans

35%

From Diskeeper Customer Survey - Read the full survey at: [www.diskeeper.com/survey](http://www.diskeeper.com/survey)

memory and disk. The fastest CPU in the world won't improve your system's performance if the drive is fragmented, because data from the disk simply can't be accessed quick enough.

### Is Daily Defragmentation Needed in today's environment?

More than ever! Large disks, multimedia files, applications, operating systems, system updates, virus signatures - all dramatically increase the rate of fragmentation. If fragmentation is not addressed daily, system performance will suffer. Fragmentation increases the time to access files for all common system activities such as opening and closing Word documents, searching for emails, opening web pages and performing virus scans. To keep performance at peak, defragmentation must be done daily.

### Advanced, automated defragmentation

Manually defragmenting every system every day is simply not

possible in even small networks let alone enterprise sites. IT Managers use Diskeeper's "Set It and Forget It" operation for automatic network-wide defragmentation. Customers agree Diskeeper maintains the performance and reliability of their desktops and servers, even reducing maintenance and increasing hardware life.

**"We run [Diskeeper] on our client PC's as well as our servers...with Diskeeper running daily, we can keep file performance at peak efficiency."**

Tom Hill, CDR Global, Inc.

Every system on your network needs Diskeeper, the Number One Automatic Defragmenter™ with over 18 million licenses sold!

## Diskeeper 10

The Number One Automatic Defragmenter

### Special Offer

**Try Diskeeper 10 FREE for 45 days!**  
Download: [www.diskeeper.com/pcm1m](http://www.diskeeper.com/pcm1m)  
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VersaLaser can transform images or drawings on your computer screen into real items made out of an amazing variety of materials... wood, plastic, fabric, paper, glass, leather, stone, ceramic, rubber... and it's as easy to use as your printer. We invite you to discover the endless possibilities for cutting, marking and etching with a VersaLaser at [www.VersaLaser.com](http://www.VersaLaser.com).

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Manufactured and protected under one or more of U.S. Patents 5,051,558; 5,661,746; 5,754,575; 5,867,517; 5,881,087; 5,894,493; 5,901,167; 5,982,803; 6,181,719; 6,313,433; 6,342,687; 6,423,925; 6,424,670. Other U.S. and International patents pending.



**IF IT QUACKS LIKE A NEWSPAPER DEPT.:**

**I**F IT QUACKS LIKE A NEWSPAPER DEPT.: The *New York Times* Web site recently went through a major overhaul and redesign, achieving the look of a real newspaper, but on the Web. I was impressed. I didn't think that a site could achieve this look and feel without employing some **serious trickery**. In the process of this changeover, *The Times* added a few blogs here and there. It is not well known, but *The Times* **standardized** all its inside blogs on the superb open-source blogging software WordPress ([www.wordpress.org](http://www.wordpress.org)). It is the same software system that I've been using on my own blog at [www.dvorak.org/blog](http://www.dvorak.org/blog).

The *New York Times*'s blogs are **much slicker** than the in-house blogs that I've seen from other newspapers and online publications. WordPress is the reason; it's real blogging software. The design team at *The Times* has done a good job of integrating their blogs with the rest of the publication. Many of the so-called blogs done by large sites are gimmicks. They **just call themselves blogs** but don't use blogging software. They're just articles like any other submitted to the newspaper or magazine that have been lightly edited and posted under the banner "blog."

Sometimes the reality chasm is so enormous that it makes you wonder what the creators of some of the so-called blogs are thinking. I know a guy who publishes an e-mail newsletter and **calls it a blog**. This is like the Post Office renaming postcards as "blogs." Come on, people! What gets me is that the word *blog* is quite unattractive and **nasty-sounding**. I would think you'd want to minimize its casual use.

One of the problems with blogs is the rigidity of their model. They rely on a simple content manager that makes the best-looking blogs in the world always **look like a blog**, in that they all use the same last-in, first-out **reverse diary presentation**. Unlike the entries in a diary or journal, the posts do not start at the beginning; instead, they start at the end. Thus, you are presented with part four before part three in a four-part post. A combination of PHP and CSS coding could fix this. But the sad reality is that the coders who write PHP scripts seldom do much with CSS, and the artsy designers who do CSS cannot code PHP. So the look and feel of blogs **has stagnated**, except for the addition of nice colors and pretty pictures.

**TV Mania Goes Mainstream Dept.:** One other aspect of *The New York Times*'s site that I need to mention is its inclusion of **video on the front page**.

In case you haven't noticed, a peculiar video mania has been sweeping the Web ever since people discovered that streaming Flash was both efficient and easy to embed. With sites such as **YouTube** ([www.youtube.com](http://www.youtube.com)) becoming overnight sensations along with Google Video, streaming Flash is a breakthrough. There is no more of that "buffering" nonsense. Even Ziff Davis Media has gotten into the TV act and has recently started to stream Flash, including for my new video show, **Cranky Geeks**. Go to [www.crankygeeks.com](http://www.crankygeeks.com) to check it out. It's perfect programming for the video iPod. And yes, I do try to be cranky. In fact, the show is made up of a bunch of leftover ZDTV folks who didn't want to quit show business.

**The Sound of Silence Dept.:** Anyone who has fired up one of the new dual-core processor ma-

**Many of the so-called blogs done by large sites are gimmicks. They just call themselves blogs but don't use blogging software.**

chines quickly realizes that unless you want it to overheat and blow up, you have to push a lot of cool air over it. And unless you lash up a liquid cooling system, this **means noise** and lots of it. Well, one company will now build a killer machine for you without the noise. EndPcNoise.com, a **new computer maker** in Vancouver, Washington, has emerged on the scene, and it is taking a unique tack: Unlike the so-called "white box" manufacturers of the past, EndPcNoise.com builds only **silent computers**, including some models that have no fans whatsoever. I had the company use all of its tricks to build me a loaded dual-core dual-SLI box. And while this box does have fans, it is still so thoroughly soundproof that it's the quietest machine I've had, short of a fanless laptop. The box, a reengineered Antec case, is also filled with sound-muffling foam.

I now consider this EndPcNoise.com computer the **greatest machine I've ever owned**. I usually like to build my own machines, but these guys do a much better job in every way. If you're thinking of getting a new machine from any brand-name company, think seriously about EndPcNoise.com ([www.endpcnoise.com](http://www.endpcnoise.com)). They can turn out a custom unit for you or your company in 24 hours. The company also sells all sorts of sound-related accessories and specialty fans for processors. **Highly recommended.** □

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MICHAEL J. MILLER

# Why Booting Windows on Macs Matters

**A**PPLE'S RECENT ANNOUNCEMENT of its Boot Camp software, which lets Macintosh systems boot Microsoft Windows, is both a major step toward competing with Windows PC makers like Dell and Hewlett-Packard and a bow to the reality that a whole lot of people want to run Windows apps.

The beta version of Boot Camp lets you run a Windows XP installation disc on an Intel-based Macintosh, and Apple plans to make it a standard feature of Leopard, the next major release of Mac OS X. In recent weeks I've seen other programs that let you run Windows on a Mac, but they don't work as elegantly as Boot Camp, which simplifies the process by making a driver disk for the Windows install and displaying a simple screen for choosing which OS to boot: OS X or Windows. We've tried it in the office, and it works surprisingly well.

I've been running a number of Intel-based Macs lately and find a lot to like. Apple's hardware designs are the best in the industry. The all-in-one iMac really does look like a flat-panel TV floating above a keyboard. The MacBook Pro has a very nice wide-screen display for a very thin laptop. The tiny Mac mini is the smallest desktop machine on the market. And the iMac and the MacBook Pro have built-in Web cameras positioned just above the screen that connect easily with Apple's iChat software.

All the machines support 802.11b/g and Bluetooth networks, which is very rare for desktop PCs. This support makes for easy setup in any location on your home's wireless network, although I had to search the message boards to get my Mac to work with my WEP key. And on a network these Mac systems offer access to music and photos on any system in the house running iTunes or iPhoto.

The iMac and the Mac mini both come with Front Row software and a remote. Front Row is essentially a competitor of Windows Media Center Edition; it lets you easily display slide shows and play music and videos by remote control from up to 10 feet away. Front Row is more elegant than Media

Center, and the remote has a simple scroll button and menu key, much like on an iPod.

Sometimes, however, the very features that make Macs so enjoyable also drive me crazy. The Mac mini's external power supply is almost half the size of the unit itself. Setting up the wireless network wasn't easy. And Front Row doesn't support TV recording.

Software remains the big differentiator between Macs and Windows PCs. OS X and the iLife suite of applications are great for organizing music and photos and surfing the Web. Yet your choices in third-party apps are limited. Rosetta, the software that lets applications written for PowerPC Macs work on Intel-based Macs, is surprisingly good. But

*In the short term, Boot camp will be most useful for people who want to move to a Mac but need to run a particular Windows app.*

graphic artists won't be happy with Adobe Photoshop on the Intel-based machines. Adobe won't have an Intel-based version for Macs until 2007.

Another major difference is price. Macs aren't cheap. And if you want to dual-boot, you'll need a full version of Windows, which costs about \$200. You could get a Windows machine for less, but you wouldn't be getting Apple's designs or software.

In the short term, Boot Camp will be most useful for people who want to move to the Mac but need to run a particular Windows app. The number of people running both OSs on one machine will be small, partly because of the cost and partly because most people just don't want to switch OSs.

In the long run, Boot Camp may get more Windows users to try out Macs and then move to OS X. Or Mac users may install Boot Camp initially to play games and then other Windows apps. This move is a high-risk, high-reward strategy for Apple. The company could end up as a high-end hardware vendor selling Windows machines, or it could come up with software to sell on Intel machines, which would hurt its hardware business. Whatever happens, it will be fun to watch. □

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**BILL MACHRONE**

# Out of Pandora's Box

**P**ANDORA'S BOX HELD ALL the miseries of the world. Which may make Pandora a wildly inappropriate name for a phenomenally good music service, because I've heard nothing but good from my speakers since I signed up.

Pandora is an online music service that lets you build your own stations based on similarities among songs and artists. You start with the name of a song or a favorite artist, and it streams music by that artist and others that are similar. It determines similarities by consulting the Music Genome Project, a database that contains hundreds of descriptors or "genes" that make up a song—melody, harmony, rhythm, kind of accompaniment, lyrics, subject matter, modality, and more, instead of the vast imprecision of genre.

I created a station by entering "Karrin Allyson," a jazz singer with brilliant phrasing and an endearing little rasp in her voice. Pandora played one of her songs and followed it with a Jane Monheit song. I added Frank Sinatra, and the next song was one of his, followed by a Harry Connick, Jr. tune. Other artists, such as Tony Bennett and Billie Holiday, were pleasant and predictable, and then Pandora knocked me out with a rendition of "I'll Be Around" by the exquisite but lesser-known Tierney Sutton.

One of the songs had an instrumental bridge with some brass, a couple of trumpets and a trombone, but low-key and mild. The next song Pandora played was a Dixieland instrumental. The service had taken a minor attribute in one song and elevated it to a major attribute as a trial balloon. I pulled up a menu and voted "Don't play songs like this." I didn't want it to harsh my mellow. I could also have chosen to build a new station around that song, though, for a different mood.

Testing Pandora's instrumental prowess, I made a station based on Russell Malone and Bucky Pizzarelli, two eminent jazz guitarists. Pandora played some of their stuff and then came up with "Tears" from Chet Atkins and Mark Knopfler's joint album, *Neck and Neck*. Next it floored me with Kaki King's "Exhibition," a gorgeous, sonorous exploration for solo guitar, and I clicked on "Why did you play this song?" Pandora told me, "... because it features acoustic sonority, major key tonality, a good dose of acoustic

guitar pickin', acoustic rhythm guitars and an instrumental arrangement." I couldn't agree more.

Pandora's descriptions come from a team of 35 analysts, who have listened to and analyzed all the 400,000 or so songs that so far are in the Music Genome database. Prospective analysts take a test to get the job, and only 20 percent pass. They then receive rigorous training, and their analysis is continually monitored and cross-checked by other analysts. What might seem like the ultimate work-at-home job is actually done with everyone in one room to keep synergy high and to make collaboration easy.

The Pandora player is a Flash window that shows album covers and a history of songs each station has played. It's licensed to play streams, which means that you can't choose specific songs, can't replay songs, and can skip only ten songs per hour per station, to respect the streaming license. You can build up to 100 stations; after that, you have to de-

***The Music Genome Project contains hundreds of descriptors or "genes" that make up a song, melody, harmony, rhythm, and more.***

lete some to make room for new ones. You can buy individual songs from iTunes or whole CDs from Amazon, store links to favorite songs, send stations you've built to friends, and link to them on blogs. The player is free, but it shows ads unless you buy a subscription.

The founder of Pandora and the Music Genome Project, Tim Westergren, says, "Our role is to help musicians find their audiences. In addition to analyzing all of the major artists, we solicit submissions from independents. We want to expose people to new artists."

Unless you use very stringent station criteria, you'll hear new music, and it'll be good—based on styles and sounds you already like.

"Genre is useless in this context," says Westergren. "Terminology changes all the time, but the music's genetic attributes are constants, accurate descriptors that link songs to one another in pleasing and surprising ways."

Pandora is all that—pleasing, surprising, and downright addictive, since, ultimately, every station is all about you. □

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**Troublemaker Studios'** pre-visualization supervisor, Chris Olivia, at work.





# HOLLYWOOD REBOOTS

*Through conversations with some of the most innovative studios and effects houses making movies today, we look at how PCs and digital gear have shaped the films we watch—and promise more for the future.*

**BY CADE METZ  
WITH ADDITIONAL REPORTING BY SEAN CARROLL**

THE YEAR IS 1985, AND THE MOVIE IS *YOUNG SHERLOCK HOLMES*, Hollywood's bittersweet take on the early life of the world's most famous consulting detective. Produced by Steven Spielberg, the film follows Holmes and, yes, a young Watson as they unravel a series of murders in and around their London boarding school. Local men are dying in the face of horrific hallucinations, including a priest who imagines a stained-glass knight leaping, sword in hand, from a church window. As this shimmering figure jumps feet first to the floor, Hollywood takes a leap of its own—into the digital age.

Designed by Industrial Light & Magic, the special effects house founded by Spielberg's old friend George Lucas, the stained-glass knight marked the first time a major motion picture used digital effects to represent something other than, well, digital effects. In earlier films like *Alien* and *Star Trek II: The Wrath of Khan*, digital images show up only on computer screens. In *Tron*, the 1982 cult classic about a programmer who winds up inside his own PC, effects artists mimic the graphics of early-1980s video games.





(opposite) One green wall Robert Rodriguez filmed nearly every shot of *Sim City* against one small green screen in his Austin, Texas, Troublemaker Studios. (left) Storage network Jeff Acord and Kris Bushover tweak shots at the rendering farm, which processes everything from pre-vis to finished effects.

*Young Sherlock Holmes* used CGI, computer-generated imagery, to create the illusion of photorealism, fashioning a digital object that, in the context of the film, isn't digital at all. That knight reinvented the way Hollywood made movies.

"What's so cool about the stained-glass man is that he comes toward you, passes the camera, and then moves away, so you see him from all sides," says Joe Letteri, the former ILM effects artist who now runs WETA Digital, responsible for 2005's *King Kong*. "For the first time, computer imagery was used to do something you couldn't do any other way."

This fleeting 30-second sequence was a sign of things to come. In the 20 years since *Young Sherlock Holmes*, digital technology has reinvented moviemaking several times over. If you've seen *King Kong*, which won Letteri his third Oscar, you know

how far digital effects have taken Hollywood blockbusters.

"Kong exhibited so much emotion, you felt for him, you cared about him, you loved him—all the things a character should make you do," says Scott Ross, another ILM alum who heads Digital Domain, the effects firm behind *Apollo 13* and *Titanic*.

Effects are only part of this digital awakening. Digital tools now play a role in everything from pre-production and principal photography to editing, color correction, and even distribution. Most movies are still shot on good old 35mm film, and most are distributed on film as well. But between shooting and distribution, every major movie is converted to digital format and manipulated on PCs not unlike ordinary home or office PCs. Some, including the latest *Star Wars* prequel and director Robert Rodriguez's indie

## making the modern digital film



**Scriptwriting** Contemporary screenwriters use PC applications like Final Draft to compose film scripts.

**Previsualization** The modern equivalent of storyboarding; directors use 3D imagery to map out shoots before filming.



**Filming** Most big movies are still shot on film, but a growing number are shot using high-definition digital cameras.



**The Three Wise Men** Rodney Brunet, Alex Toader (also shown above), and Chris Olivia are Troublemaker Studios' artists. Also shown, in red, is IT systems manager Kris Bushover.

hit *Sin City*, as well as such animated features as *Toy Story*, *Shrek*, and the upcoming *Over the Hedge*, are completely digital until someone prints the final cut.

#### The Genesis Effect

*Star Trek II* is famous for its "Genesis sequence." Also designed by ILM, three years before the stained-glass knight, this was the first movie sequence created solely with digital effects. Halfway through the film, Kirk, Spock, and McCoy watch a computer simulation of a device that "generates life from lifelessness." The torpedo-like device explodes on an empty moon, and new life spreads like brushfire across its surface.

Digital moviemaking exploded similarly, from work done at ILM. Yes, there were other digital pioneers, including Richard Taylor and Information International (the company behind *Tron*), as well as

PDI, which was instrumental in a host of animated CGI features. But as you cast an eye over the industry's biggest digital effects houses and the tools used by filmmakers worldwide, you realize how many trace their roots to Industrial Light & Magic.

The heads of WETA Digital (Joe Letteri) and Digital Domain (Scott Ross), the effects companies that worked on the *Lord of the Rings* trilogy, came out of ILM. Pixar, the studio that made *Toy Story* (the first entirely CGI film), is an ILM offshoot. Digital sound was born there, as was digital editing. ILM's EditDroid, the first digital film editor, was eventually sold to Avid, which provides editing software for more than 85 percent of today's major releases.

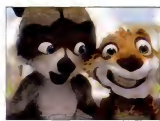
"Many of my key people came from ILM, although I didn't. I came from Pixar, which spun off from ILM," says Larry Gritz, who oversees the de-

**Special effects** After a scene is filmed (sometimes even before), 3D effects are created and layered onto the shot.



**Green screen** Directors film actors with little background, and then add it in during postproduction using CGI.

**Motion-capture CGI** Filmmakers can capture an actor's movements and use them to create CGI characters.



**CGI animation** Many animated movies are created entirely with CGI (computer-generated imagery).



**From comic-book panel to flat panel** Rodney Brunet uses panels from the *Sin City* comic book as a guide for the film's digital effects.



#### JOE LETTERI

**Title:** Visual Effects Supervisor  
**Company:** WETA Digital  
**Recent Work:** *King Kong*; *I, Robot*; *The Lord of the Rings*

**Why do you run Linux and not some other platform?**

For the larger effects houses, it would be really difficult to do the kind of work we do with anything other than Linux. You've got to have something that can run on any kind of rendering server, and it's got to run on your workstations too. Then you've got the file servers and everything else in between. You've got to have one operating system that runs everything.

ment of Gelato, a new effects tool from nVidia. were there first, and they had enough money to pursue digital filmmaking. They had the vision to know that it was the wave of the future. In fact, it was a controversial idea."

ILM continues to push the envelope. In the three *Star Wars* prequels, Lucas used digital technology for every step from the initial picture. Previously, digital tools were used at the end of the process, to edit and color grade. Lucas not only introduced the digital tools, he used software to map out what his films would look like before they were photographed.

#### Storyboard

Disney pioneered the practice in the 1930s. Today, filmmakers have planned their movies

on storyboards, making detailed sketches of each camera shot, from first scene to last. In many cases, these sketches are used to create "animatics," crude minifilms that show how various shots fit together.

Beginning with *The Phantom Menace*, Lucas and ILM digitized this planning phase, using PC software to build full-fledged 3D models of each scene. They call it previsualization, or pre-vis. "Storyboards can never accurately portray dimension, scale, and perspective," explains Daniel Gregoire, who ran pre-vis on both *Attack of the Clones* and *Revenge of the Sith*. "Pre-vis takes it that next step further, showing you everything that comes into play in the real world."

Pre-vis images are simpler, less detailed than final shots. Used only as reference points, they needn't offer the polished photo-realism of postproduction CGI. This means you can build them in their en-

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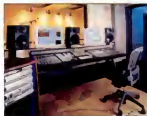
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**Color correction** Working in concert with the cameraman, technicians tweak colors down to the white of an actor's teeth.

**Sound editing** Pro Tools is the industry-standard software. With it, technicians can edit words syllable by syllable.



**Distribution** Most theaters still use film projectors, so a movie must eventually be printed.





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tirety on ordinary PCs and laptops. Artists like Gregoire create these images using software much like the tools responsible for the 3D effects that show up in a film's final cut. In some cases, the tools are exactly the same. On *The Phantom Menace*, artists used off-the-shelf 3D modeling software like Adobe After Effects and Electric Image. When Gregoire came aboard, the team switched to Maya, another popular effects tool used across the industry.

As Gregoire worked on *Revenge of the Sith*, George Lucas invited a familiar face to lend a hand—Steven Spielberg, who was so taken with the process that he hired Gregoire to previsualize his next film, *War of the Worlds*. Gregoire and his team did weeks of work prior to shooting, but even on set Spielberg would ask for more pre-vis as new ideas occurred.

"Basically I had a laptop, a couple of FireWire drives, and some extra batteries, and I was within shouting distance of Steven for the entire production," Gregoire continues. "He would walk over and describe a shot, and I could produce it in a couple of hours. Then he'd gather the crew around, so they could see what he wanted and understand what they needed to do." The now famous shot of Tom Cruise driving a minivan past New Jersey's Bayonne Bridge was set up on Gregoire's laptop the day before.

Spielberg isn't the only one to follow ILM's lead. After a visit with Rick McCallum, a producer on the

*Star Wars* prequels, WETA and director Peter Jackson used pre-vis on *The Lord of the Rings*. With *King Kong*, the team started the process before Jackson had even written the script.

The famously frugal Robert Rodriguez has his own in-house effects company, Troublemaker Studios, which cranks out up to six detailed 3D animatics in a day when he's in production, all with just three core artists, known as the Three Wise Men, and an IT staff of two. The lines blur between pre-vis and final shots at Troublemaker, since they're all composed on the same PCs—dual-core AMD Opterons—using the same Softimage XSI software. According to wise man Chris Olivia, "In pre-vis the current technology allows us to do things much, much faster, and it looks more and more like finished work."

#### The Death of Film?

The bigger leap came on *Attack of the Clones*, the first major picture shot with a high-definition digital camera: the Sony HDW-F900. Film, the stuff we've made movies with for more than a hundred years, played no part.

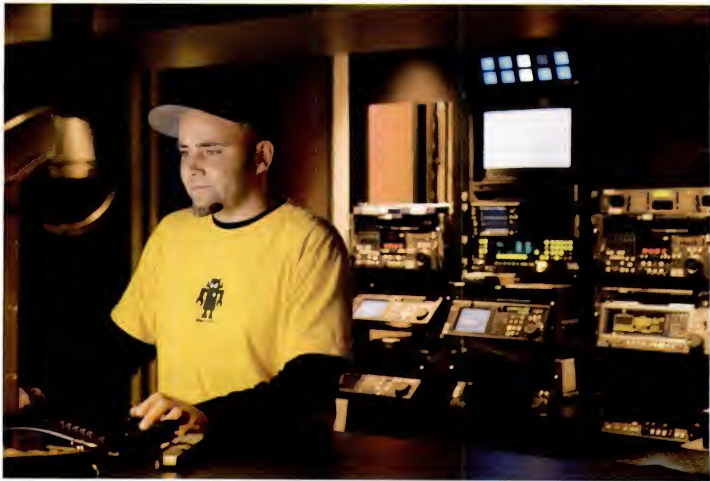
High-definition, or HD, provides an image remarkably similar to what you get with 35mm film while eliminating a good part of the hassle. "You can work much more efficiently," says Cliff Plumer, ILM's CTO. "Instead of waiting for the dailies to see

#### MORE ON THE WEB

For extended interviews with the moviemakers interviewed for this story, go to [go.pcmag.com/themovies](http://go.pcmag.com/themovies).

#### Industrial Light & Magic

The new Letterman Digital Arts Center offers 860,000 square feet of the latest digital movie-making hardware.



**Private showings** The Lucasfilm campus includes its own 300-seat theater, equipped for film and digital projection.



**Hard drive to silver screen**  
Lucasfilm technicians project digital dailies straight from PC hard drives.

how something will look on film, you can see the final image instantly, as you're shooting it. That's huge. We can save a director so much money by seeing and correcting problems right there on set.

George Lucas not only sees his final image in real time on an HD monitor, he can record that image straight to low-cost digital tapes. A 33-minute HD tape sells for around \$20, whereas 33 minutes of film sets him back around \$1,500. Plus he eliminates processing costs; a digital image doesn't require developing. Of course, if you're George Lucas, cost is a side issue. HD is ultimately as attractive as it is because it lets you instantly shuttle images from your camera to the PC workstations where you handle editing and effects work. You simply pop your tapes into a deck that connects to a hard drive via FireWire. For *The Phantom Menace*, shot in 35mm, Lucas and ILM were forced to develop their footage, then convert it to a digital format using film scanners, devices as slow as they are expensive.

While shooting *Attack of the Clones*, Lucas screened dailies for Robert Rodriguez. The indie filmmaker immediately decided to shoot his next movie in HD. That project was *Once Upon a Time in Mexico*, and he's never looked back. For Rodriguez, famous for working at blazing speed, HD means he works even faster and more efficiently. With his new movie *Grind House*, Rodriguez is editing rough cuts of sequences on the fly, on location—something he never could have done before HD.

Lucas and Rodriguez aren't alone. Director Michael Mann, celebrated for writing and directing

such popular movies as *Heat* and *The Insider*, embraced hi-def for his 2004 feature *Collateral*, with Tom Cruise and Jamie Foxx. And as James Cameron prepares a quartet of new features—his first since the 1997 runaway hit *Titanic*—he plans to shoot in HD as well. Hi-def saves even more time, money, and hassle when you shoot in 3D, a process that requires two cameras sitting side by side. Rodriguez used a pair of HD cameras on *Spy Kids 3-D*, and according to producer Jon Landau, Cameron intends to use a similar process on one of his upcoming projects, rumored to be a feature called *Dive*.

"Traditionally, the problem with 3D was that you were stuck with 300- and 400-pound behemoth cameras, and it's difficult to get these close enough to simulate human vision," says Landau. "We use two HD cameras for that stereo effect, but it's actually smaller than a single Panavision film camera."

#### Goodbye to the Moviola

Given the prevalence of digital tech throughout the moviemaking process, it's amazing that most Hollywood movies are still shot on film. The trouble is, HD cameras can't capture the same range of light as traditional cameras can, and moviemakers often complain that the HD image is too pristine, too unforgiving. "Film is still the better capture medium," says Joe Letteri. "HD cameras approach what you can do with film, but film has a wider color gamut and wider dynamic range. You can achieve contrast on film in a way that's very difficult to do with a large-format, 24-frames-a-second HD camera."



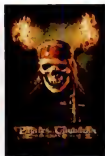
#### DANIEL GREGOIRE

**Title:** CEO and Founder, Previsualization Artist  
**Company:** Halon Entertainment  
**Recent Work:** *War of the Worlds*, *Star Wars Episodes II and III*

#### How much detail goes into previsualization?

We'll go out and visit a location, canvass the area, take photos of all the pertinent items: building facades, streets, rooftops. We look at environmental conditions: the sky, the light, all sorts of things. Then we'll bring all that back and build it into something almost like a game environment, with 3D geometry that represents the shapes and forms of an entire location.

**AMD on Linux** ILM's chief technology officer, Cliff Plumer, runs a CGI rendering farm of over 3,000 servers.



**Coming Soon**  
Summer blockbusters from Lucasfilms, featuring the effects work of ILM, include *Mission: Impossible III*, *Pirates of the Caribbean II*, and *Poseidon*.



**TIM JOHNSON**

**Title:** Director  
**Company:** DreamWorks  
**Animation/PDI**  
**Recent Work:** *Over the Hedge*, *Antz*

*In live-action moviemaking, filmmakers worry about digital images looking too sharp, too pristine. Is it the same in the world of CGI? We do spend a good amount of time "messing up" our computer-generated imagery. We actually work very hard to get away from the slick, perfect sort of bright, saturated-video look of a fully digital image. With *Over the Hedge*, for instance, we labored very hard to have a very shallow depth of field, a very shallow focus, so that you have a lot of dappled light in the background.*

Robert Rodriguez has compared this attitude to the notion that music sounds better on vinyl records, but the fact remains that, apart from Lucas, Rodriguez, Cameron, and Mann, no major director shoots in HD. That fact is doubly amazing when you realize that all film footage is converted to digital format during postproduction. Whether a film is shot digitally or not, every major motion picture winds up on a computer screen when it comes time to edit and add effects. That's been the case for almost a decade.

In 1993, with a little help from ILM, Avid introduced Film Composer, the first digital film editor capable of handling footage shot at 24 frames a second, the movie industry standard. That year *Lost in Yonkers* became the first digitally edited Hollywood movie, and within the next three years, almost no one was cutting film on cumbersome analog machines like the Moviola. Today, there's only one director who still does: Steven Spielberg may have embraced pre-viz, but when he sits down with his editor Michael Kahn, he prefers the feel of celluloid.

In this sense Spielberg makes things difficult. Switching from a Moviola to a digital editor is like going from a typewriter to a word processor. "On the first cut, you work about ten times faster, and you're much more thorough," says veteran editor Bob Reitano, who cut such films as *Sleepless in Seattle* and *Billy Bathgate*. "When making changes, you work about 20 times faster. Which means you can do in a day what you used to do in month." When working for anyone other than Spielberg, Kahn cuts digitally.

Originally, software from Avid and its chief competitor, LightWorks, ran on proprietary machines that sold for tens of thousands of dollars. In 2003 Apple introduced Final Cut Pro, an under-\$2,000 package that runs on the Mac, and Walter Murch (another big industry name with ties to George Lucas) used it to edit Anthony Minghella's *Cold Mountain*. Today movies are typically edited on standard PCs.

#### Twenty-First-Century CGI

During this "digital intermediate" stage, filmmakers have free rein to layer on as much CGI as they like. Software has improved to the point where you can now use digital effects to create most of your movie, if not all of it. Cliff Plumer estimates that about 90 percent of *Star Wars: Episode III* was computer generated. In much the same way that Lucas made the *Star Wars* prequels, Robert Rodriguez shot *Sin City* against an empty green screen, then added backgrounds digitally in postproduction.

Animated features like *Toy Story*, *Shrek*, and *Over the Hedge* go one step further. Every single image is CG. *Over the Hedge*, from DreamWorks and PDI (the animation house DreamWorks purchased in 2001), took four years to make, and the only parts that are not computer generated are the voices of such actors as Bruce Willis, Gary Shandling, and Steve Carell. Of course that voice work is recorded and edited digitally—like all modern movie sound.

In some cases, CGI is handled with off-the-shelf software like Maya, or even Adobe Photoshop, but at least half is done with custom-built tools. Dream-



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Plug yourself in.

Works and PDI coded new software for their first CGI feature, *Antz*, and continue to roll their own today. "I liken it to guys in the garage with their hot rods," says Tim Johnson, director of *Antz* and *Over the Hedge*. "We have our own software engineers who write this stuff for us and customize it for every new commercial, logo, character, or film we're doing."

Basically, artists design CG images on individual workstations, before complex textures and colors are rendered overnight on enormous server farms. DreamWorks and PDI employ about 1,000 artist workstations and more than 4,500 rendering servers. Until the beginning of the decade most effects houses and animation studios used proprietary Unix hardware from Silicon Graphics. But nowadays most of the industry uses open platforms.

Generally, workstations and servers run Linux on AMD processors, though Intel and Mac machines pop up here and there. AMD Athlon and Opteron boxes provide performance well beyond old SGI workstations at a fraction of the cost, while Linux provides the easiest—and cheapest—way to accommodate old Unix code and all sorts of different devices. "Now we run on commodity hardware," says ILM's Cliff Plumer. "That's cheaper, easier to support, and there are so many more software solutions to choose from." ILM built *Revenge of the Sith* on machines much like the one you use at home.

#### The Final Frontier

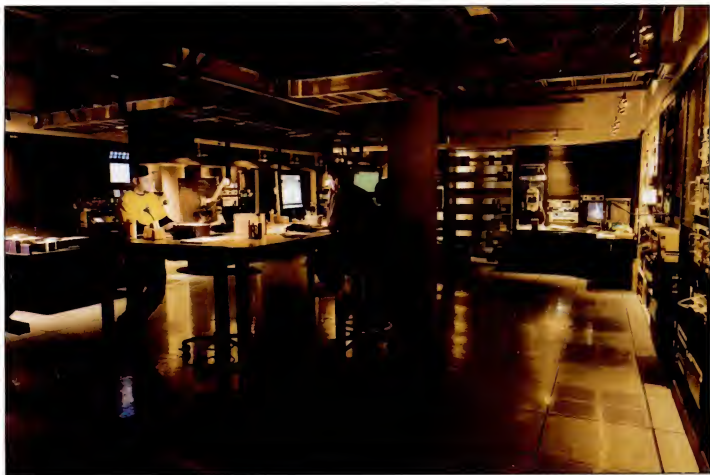
Despite all this high-tech moviemaking, a long way from purely digital cinema. *Antz* is not only shot on film but distributed on *movies*. Even 100-percent CGI features like *Over the Hedge* get printed to 35mm for theaters. The average house uses nothing but reel-to-reel projectors.

The good news is that digital projection is slowly gaining a foothold. IMAX theatres typically offer digital projectors, and most can handle digital 3D. All the major film festivals are now digitally equipped. And in December chain owners AMC Entertainment, Cinemark USA, and Regal Entertainment announced plans to upgrade their theaters, which account for a third of the country's movie screens.

"It's hard not to want every theater to have digital projection once you see the results," says Tim Johnson. "Nowadays, your movie never looks as bright and color-rich in the theater as it did when you saw it under ideal conditions. Digital projection will ensure that movies look as flawless as possible across as many theaters as possible."

That's what digital cinema is about: making sure moviemakers can deliver their original vision intact to the big screen. Upgrading theaters will cost billions, but it's sure to happen. It took us only 20 years to get from the stained-glass knight to *Revenge of the Sith*, and in the next 20, we'll go just as far. □

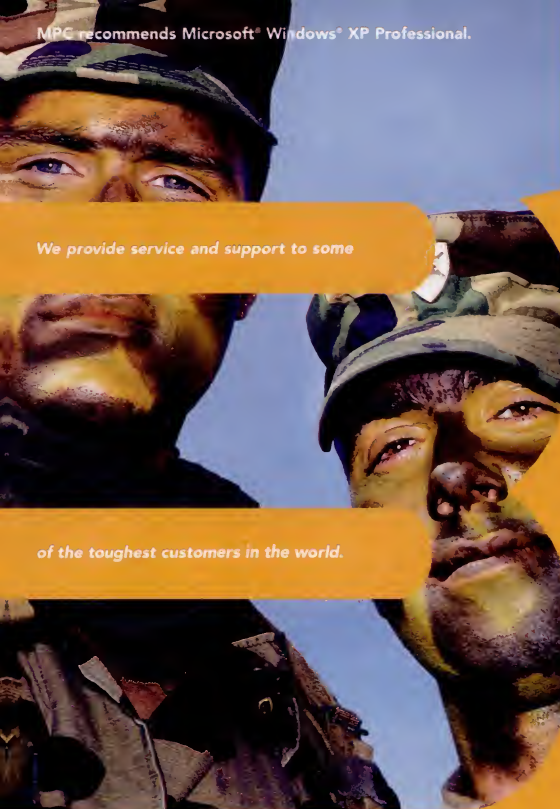
**Media control room**  
Lucasfilm technicians oversee the transfer of movie footage to and from a 100TB network.



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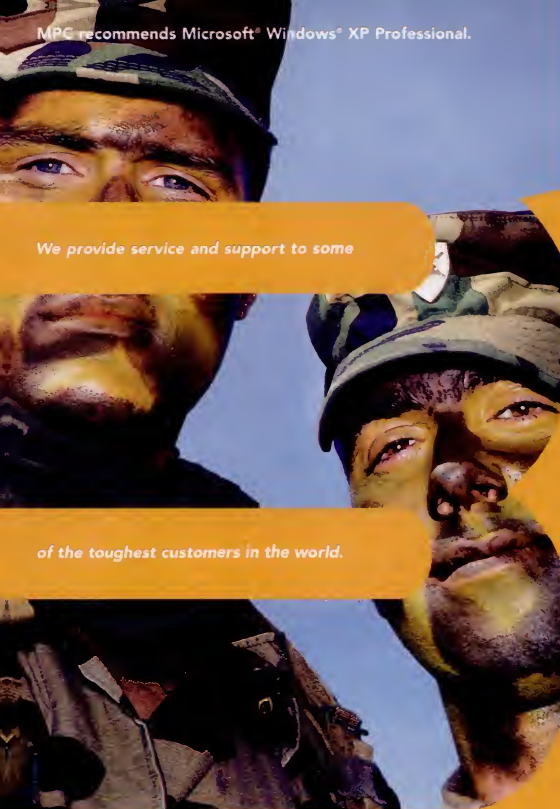
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*From casting to  
cameras to  
postproduction,  
the all-digital  
making of  
The Insurgents  
redefines the  
meaning of  
"low-budget."*

BY CADE METZ

**I**F YOU KNOW YOUR MOVIES, YOU KNOW *The Blair Witch Project*. Shot largely with a Hi8 video camcorder and promoted with ingenious thrift over the Internet, the 1999 indie thriller was widely hailed as a triumph of modern technology. First-time filmmakers Daniel Myrick and Eduardo Sánchez made *Blair Witch* for less than \$25,000, and in the wake of a now famous midnight screening at the Sundance Film Festival, the film went on to gross more than \$140 million in the U.S. alone.

The rub is that *Blair Witch* doesn't look like a feature film, and it's not supposed to. That's part of its charm, but there's no forgetting that it was made on the cheap. The image is shaky and imprecise, the lighting harsh, the performances less than professional. At times, you can even hear the crew laughing in the background. Without its self-referential premise, *Blair Witch* is just another poorly made amateur film.

The real revolution starts today. Eight years after *Blair Witch*, digital technology has improved to the point where you can make a true Motion Picture—with a cinema-quality image, bona fide special effects, even name actors—for little more than Myrick and Sánchez spent on their run-and-gun indie.

This winter, Web designer/writer-director Scott Dacko proved it with *The Insurgents*, a political thriller starring Mary Stuart Masterson (of *Fried Green Tomatoes* fame), NYPD *Blue*'s Henry Simmons, indie up-and-comer Juliette Marquis, and veteran character actor John Shea. Shot in New York City under the new Ultra-Low Budget Agreement introduced by the Screen Actors Guild last July, it was financed for less than \$200,000 in cash. But thanks to today's technology, you'd never know it.

*The Insurgents* has all the earmarks of a big-time feature. It's photographed in the kind of panoramic widescreen format you associate with trips to the local movie theatre. Its editor, Bob Reitano, has cut several pictures for Nora Ephron, including *Sleepless in Seattle*. Masterson and Shea are veterans of Oscar-nominated projects. It's quite a feat—and it's all due to new technology.

# Making an



Photographs by Scott Schedivy



# Indie Film





### ONES AND ZEROS

The making of Scott Dacko's indie thriller, *The Insurgents*, was digital from beginning to end. It was shot with a high-definition digital camera, the Panasonic Varicam (center), recorded to tape (right), and shuttled to a Macintosh G5 (left), where it was edited in less than a month. Even the clapboard was digital.



### Making Films Without Film

Scott Dacko took *The Insurgents* from script to full-blown movie in little more than nine months, and every step hinged on tools of the digital age. The project began with a laptop and a Web browser in Dacko's New York apartment. The final cut came together on a Macintosh G5 just blocks away. And in between, you can point to countless other steps that would not have been possible only a few years ago, from the PC Card hard drives used for recording sound to the GPS boxes used to track down shooting locations.

All of this new technology was instrumental in and crucial for completing the project quickly and inexpensively. But the tool that made the movie possible in the first place—and that elevates *The Insurgents* above ultra-low-budget films of the past—is high-definition digital photography. With hi-def, you can shoot at low cost and still create an image that competes with good old-fashioned 35mm film.

Make no mistake: Hi-def digital photography can't duplicate the classic film image. It can't capture anywhere near the same range of light—you lose a full 12 f-stops—which eliminates anything too dark or too bright. And in the minds of many film enthusiasts, if you project onto a large enough screen, HD can still look, well, digital. "It masks nothing. It smooths nothing. It eases nothing," says Reitano. "Film still does all that."

But HD offers resolution and color depth comparable to 35mm. Some even argue that it's a step ahead in these respects. Whatever the case, to the average Joe, HD looks like the real deal, and with so many filmmakers now shooting in the new format, including big names like George Lucas, the movie establishment is finally beginning to embrace it. Today, all the major movie festivals offer digital projection, and, more than ever, an HD film has a shot at widespread distribution.

This means that someone like Dacko can cut costs on photography without losing too much production value—the stuff that turns a movie

into a Movie. You have not only the extra money you need to attract name actors, you have the cinema look and feel you need as well. Of course, signing actors isn't easy, and a good movie depends on more than production values. But HD gives you a chance.

### A New Way of Networking

By the middle of last year, Dacko was tired of asking other people to make his movies. On the strength of several screenplays, he signed with an agent. One screenplay was optioned by an independent production company and another made some noise in one of the bigger indie writing contests. But the wheels were slow to turn, and when he finished writing *The Insurgents*, he decided it was time to make a movie on his own.

The first thing he did was open his Web browser.

Armed with a screenplay and a few thousand dollars of his own money, he logged on to [mandy.com](http://mandy.com), a kind of craigslist for the film and television industries. He posted two ads: one for a cameraman and one for a line producer, someone to oversee logistics. The first responses arrived within minutes, and over the next few days, he received dozens of calls from producers and countless DVD "reels" from cinematographers. He even heard from an Oscar winner.

Within days, Dacko hired a line producer, and the project snowballed from there. Originally, he planned to shoot the entire film using only the money on hand. But through this initial hire, Dacko attracted a trio of New York-based producing partners. In exchange for equity—a cut of the film's profits—all three partners contributed money and services.

Angel Baby Entertainment, a production company whose credits include the upcoming Vanessa L. Williams vehicle *My Brother*, provided legal services and many of the important industry connections. Mary Stuart Masterson came on board after Angel Baby's John Gallagher, a writer-



director in his own right, arranged a call to her mother, actress Carlin Glynn.

Another production house, Full Glass Films, took over as line producer. The third, Offhollywood Digital, handled postproduction, including color correction, special effects, and sound editing. With these three on board, the budget nearly doubled.

They joined the project because they liked the script, which takes post-9/11 fears and turns them upside down, following four Americans as they plan to detonate a bomb on U.S. soil. "The script had a vibrancy I knew would attract good actors,"

explains Angel Baby's Greg Segal, "and after the success of films like *Syriana* and *Good Night, and Good Luck*, I liked the timeliness of the political story." Of course, Segal and the rest wouldn't have read the script if not for *mandy.com*.

#### Widescreen on a Slim Budget

The extra money wasn't spent on film. From the very beginning, Dacko was set on HD, and as the budget grew, he never even entertained the thought of shooting on film. After ten years as a Web designer, he's comfortable with all things digital. He knew HD would give him more control.

#### TOOLS OF THE TRADE

On the set, technicians recorded background sound to 5GB PC Card hard drives (left)—much like the kind you'd find at a CompUSA. A 14-inch hi-def monitor displayed a live camera image (right), where the cinematographer could check composition, focus, and color. Elsewhere, Dacko, the director, had his own 9-inch display.



#### LIGHTS! CAMERA! ACTION!

On the final day of shooting, in a New York City loft, up-and-coming actors Michael Mosley and Juliette Marquis play a scene for cinematographer Learan Kahanov and his Panasonic Varicam. Above the camera, an LCD monitor with built-in waveform serves as a light meter, showing Kahanov where his image is too light or too dark.



## SHOOTING IN SERIES

As a production assistant carries the Varicam from one camera setup to another (left), writer-director Scott Dacko and his star, Mary Stuart Masterson, take five (middle). Meanwhile, a camera dolly (right), no different from those used with traditional film cameras, is on hand to provide for a rolling shot in the next scene.



"I'm a digital guy," he says. "I knew that if I shot in digital, even if I ran out of money halfway through, I could take the source files and edit them myself, color-correct all on my own. There was so much more that, in a pinch, I knew I could do bootstrapped."

Plus, if he switched to film, Dacko wouldn't have much money left for cast and crew. The typical 35mm indie uses around 100,000 feet of film, and each foot costs nearly 50 cents. That's \$50,000 for film stock alone. And then you pay for processing. Shooting in HD, Dacko paid around \$20 for each 33-minute digital tape, using about 50 tapes over the course of a three-

week shoot, and his processing costs were nonexistent. That freed up precious dollars for hiring the likes of Mary Stuart Masterson, Henry Simmons, and Bob Reitano.

What he did do is work to ensure that his HD image was as close to film as possible. Together with his cinematographer, Learan Kahanov, a veteran of six features, he decided to shoot with the Panasonic Varicam. The Varicam uses a lower resolution than its main competitor, the Sony HDW-F900—1,280 by 720 versus 1,920 by 1,080—but it offers a "film rec" mode that, in Dacko and Kahanov's opinion, comes closer to that intangible thing we call cinema.

Moreover, the two opted for widescreen, an image with an aspect ratio of 2.35 to 1. "Choosing widescreen was a way of differentiating this project from all the other low-budget films out there."

They considered using an anamorphic adapter, a device that attaches to the front of the camera and converts the standard HD image to widescreen without losing resolution. But the adapter added 9 inches to the camera, making it all the more difficult to shoot in the film's tight New York locations. Instead, Dacko and Kahanov went with state-of-art digital lenses, Zeiss DigiPrimes, getting as much detail into the image as possible before cropping the image in postproduction to attain the widescreen look. Yes, that loses precious lines of resolution. But, after tests in a small theater before the official shoot, they were confident this ad hoc widescreen image would retain its detailed look when projected for an audience.

**DIGITAL MOVIE CHECKLIST** Wanna make your own feature film? To do it right, you'll still need a pretty hefty chunk o' change, but new digital technologies make it cheaper and easier than ever before. Here's a list of the digital tools you'll need to keep costs to a minimum.

**mandy.com** Think of it as a Craigslist for the film and television industries, a place to find everything from line producers, cinematographers, and actors to electricians and lighting crew. Cost: free.

**HD camera package** For a cinema-quality film, you'll need an HD camera along the lines of the Panasonic Varicam or the Sony HDW-F900. With lenses. Rental cost: \$3,000 to \$4,000 a week.

**HD digital tapes** Each HD tape can hold around 33 minutes of footage. Cost: roughly \$20 per tape.

**HD tape deck** A way to get HD footage from tape onto a hard drive. Cost: a few thousand dollars a week. A new HD deck starts at about \$40,000.

**Digital editor** Today's digital editors, including Avid Xpress Pro and Apple's Final Cut Pro, run on standard PCs and Macs. Cost: \$1,000 to \$1,700.

**Digital sound editor** A simplified version of the industry-standard sound editor Pro Tools is available for as little as \$75.

**Special effects and color-correction software** You can buy tools like FinalTouch, Apple's Shake, and Photoshop off the shelf for just a few hundred dollars.

**Desktop PC** To run all this postproduction software, you'll need a decent desktop PC or Mac with an HD output card, an extra monitor or two, and some spacious hard drives. Cost: \$5,000 to \$10,000.

## A Movie Set is a Movie Set

The shoot wasn't all that different from a traditional film shoot. Because HD captures a limited range of light, Kahanov lit *The Insurgents* a bit more carefully than he would have if he had been working with film. But he used everything from stationary camera setups to dolly shots and Steadicam. Primary sound was recorded on cam-



era, via boom mic. Production assistants (PAs) ran around with walkie-talkies. A craft services table was never far away.

Kahanov set up each shot using an on-camera LCD monitor with a built-in waveform. "The waveform acts as a kind of light meter," he explains. "I know if things are clipped at the white end of the spectrum or if things are too dark. I'm not staring at it like it's a hard-and-fast rule, but it gives me an idea of where I stand with the light." Then, off camera, he checked composition, focus, and color on a 14-inch HD monitor. This showed the full 1,280-by-720 image, while Dacko watched on his own 9-inch monitor, where the shot was masked to show the final widescreen image.

Image and primary sound were recorded to HD tapes, each carefully cataloged by a PA. And across the set, tapping into a pair of wireless mics clipped to the actors, a sound mixer recorded backup sound to a 5GB PC Card hard drive.

The biggest difference is that Dacko was free to keep the camera rolling. HD tapes are so cheap, he didn't need to worry about filling them. This meant the actors were more relaxed, and in the end, the shoot was more efficient. "On a film set, as soon as you yell 'cut,' everybody stops working," says Dacko. "When shooting digitally, you don't have to cut. I can shoot in series. It allows for more takes, and it allows for actors to rehearse on the fly, which is invaluable on a low-budget independent production."

#### Postproduction on a PC

Dailies were available within 24 hours, and Reitano cut the whole film in less than four weeks. After each day's shoot, PAs shuttled tapes to Offhollywood Digital, and technicians slipped them into a Varicam "deck" that streams footage onto a G-RAID hard drive via FireWire cable. From there, the footage was compressed and burned onto DVD. Before going to bed each

night, Dacko watched the dailies on his home television.

Meanwhile, the same G-RAID drive was plugged into a dual-G5 desktop where Reitano edited the picture using Apple's Final Cut Pro. His machine went a bit beyond the average PC, including two LCD monitors—one for the Mac desktop, and one for Final Cut—as well as an AJA Kona card and broadcast monitor for viewing the cut in hi-def. But the whole setup—owned by Offhollywood—cost less than \$10,000.

Once the final cut was locked, Offhollywood technicians edited sound, corrected color, and added special effects. Sound was edited on that industry mainstay, Pro Tools, using audio recorded to camera as well as the backup recorded to those PC Card drives. Technicians have such control over sound editing that they can instantly move bits and pieces from any source and drop them wherever they like. "You can go through the film word by word," says the project's sound mixer, Brian Miklas. "If there's a problem with a word, you can replace it with another from another take. You can even replace syllables."

FinalTouch, from Silicon Color, handled color correction. Special effects—including some gun play, explosions, even a bit of digital gore—were done with Apple's Shake and, believe it or not, good old Adobe Photoshop. "There's a scene where someone gets shot in the head," says Mark Peterson, Offhollywood's cofounder. "We have an artist who uses Photoshop to actually paint the gore on each individual frame." Within two months of the first day of shooting, *The Insurgents* was finished.

#### A Whole New World

This spring, Dacko plans to submit *The Insurgents* to both Cannes and Toronto, two of the year's biggest film festivals. Later in the year, he'll try Sundance, Tribeca, and Los Angeles, among others. The hope is that a festival showing will lead to widespread theatrical distribution.

#### TALKING PICTURES

As sound mixer Brian Miklas records background sound via tiny mics (left), primary sound is captured through a boom mic and recorded to the same digital tapes as the movie image (right). In postproduction, sound from both sources can be mixed using an app called Pro Tools and matched with stock sounds and off-set recordings.

#### » MORE ON THE WEB

For an interview with the director, log on to [go.pcmag.com/themovies](http://go.pcmag.com/themovies). Check out the film's Web site at [www.insurgentsmovie.com](http://www.insurgentsmovie.com). You can also find its listing on the Internet Movie Database at [us.imdb.com/title/tt0758757](http://us.imdb.com/title/tt0758757).





### SOME KIND OF WONDERFUL

Mary Stuart Masterson, who rose to fame in movies like *Fried Green Tomatoes* and *Benji & Joon*, joined the cast after producer John Gallagher arranged a phone call to her mother. Not a bad catch for a movie made for less than \$200,000.

But today's digital world offers other options. He can distribute via DVD and over the Web. New Internet video services like Google Video, iFilm, iTunes, and YouTube are still in their infancy, but they're already reinventing the way films get seen. Ben Rekhi, a friend of Offhollywood's Peterson, distributed his new film, *Waterborne*, over Google Video during the site's launch in early January. For the first two weeks, the film was available for free, and over 25,000 people saw it. Since then, with Google still showing a free trailer, hundreds have paid to download the picture, and DVD sales are unusually high for such a small film. Dacko has not decided on a distribution method for *The Insurgents*, but he has several new options open to him, unlike a few years ago.

"These new models are rapidly evolving," says Peterson. "No one knows what the shakeout is going

to be, but clearly there's opportunity. When things change rapidly, there's always opportunity."

In the indie world, thanks to digital technology, everything's changing rapidly: Job markets. Casting services. Cameras. Postproduction equipment. Marketing. Distribution. It's all getting cheaper and more accessible. The end result is that someone like Scott Dacko can take a well-written script and turn it into a movie that deserves to play on the big screen and that also has every chance of attracting an audience.

"It's a very exciting time in filmmaking. The tools are becoming exponentially more powerful and exponentially more affordable, and what becomes important is the storyteller," Peterson explains. "Some worry that people who shouldn't make movies will make movies, but I say 'Who cares?' We now live in a world where the talent can rise to the top." □

## Q & A BOB REITANO, EDITOR, *THE INSURGENTS*

After working as a sound editor on such classic 1970s films as *Serpico* and *The Heartbreak Kid*, Bob Reitano made the leap to film editing. By the early nineties, he was cutting big Hollywood pictures for the likes of Nora Ephron and Robert Benton, including *Sleepless in Seattle* and *Billy Bathgate*.

**You edited *The Insurgents* on Apple's Final Cut Pro. When did you first make the switch from traditional film editing to digital?** More than ten years ago. On a Friday, I was on a Moviola, editing the last Katharine Hepburn television film, *This Can't Be Love*, and on Monday, I was on a digital system called Lightworks, cutting a feature film called *Mixed Nuts*.

### Do you prefer digital?

There's no comparison. It's bliss. On the first cut, you work about ten times faster, and you're much more thorough. When making changes, you work about 20 times faster. Which means you can do in a day what you used to do in month. I worked mostly Moviolas until the day I went to these systems. I was standing up. It was noisy. And it was dirty. Now, I sit down in the most comfortable surroundings, and there's no noise. On a Moviola, I had one track to work with—two if I worked on a console machine. Here, I have 24 tracks to choose from. I can put music in, add sound effects. It gives me a sense of the whole movie even when I'm going through it scene by scene. Would you rather write an article on a typewriter or a computer? It's exactly the same thing.

### Aren't there drawbacks?

When you were working a Moviola or flatbed, directors hated to be in the cutting room because it was so slow. You had a certain privacy that came with the mystique of these mysterious machines. They would never touch them. Today, the downside is that directors know the software, and it's not unusual for them to say, "It's okay. Just let me try something. You can go."

### Was it difficult to make the transition?

Not at all. The way it worked was so much more pleasurable, and I knew that right from the very beginning. I was just eager to be on the new system and learn it, and that only takes a couple of days. Basically, there are only eight things we do: Add it on, overlap it, take it out, and so on. And if you have competent assistants, you can just turn to them and say "You do the dirty work."

### Have you used Final Cut Pro before?

No, but it gives you the same eight functions. I prefer Avid, but only because it's simpler. Final Cut is a multipurpose machine. It's used for videos and commercials, and therefore, it offers things that a feature editor doesn't require. Of course, it's less than \$10,000, and Avid sells for \$150,000. But Avid now has a less expensive "Express" version, and if I were buying, that's what I'd choose. But you have to be willing to use them all. For the same reason, you need to know how to cut on a flatbed and on a Moviola.



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# The New Power Generation

*New batteries promise extra power for cameras. But do they deliver?*

BY TROY DREIER

## COST PER HOUR



RCA Portable Television  
Batteries needed: 3 AA

\$ .60	Panasonic Oxyride	3.40
.19	IKEA	4.00
.74	Duracell CopperTop	4.04
.73	Energizer Max	4.07
.54	RadioShack Enercell	4.08
.94	Duracell Ultra	4.45
2.03	Energizer e <sup>2</sup> Lithium	6.15

Life span (hr:min)

**S**URE, SHOPPING FOR ELECTRONICS IS no picnic. You drive to a store so large it's visible from space and wander the maze-like aisles until you find what you need. But at least there's a clerk or two there to help you—often poorly informed and commission-motivated, but it's help nonetheless.

Shop for batteries, though, and you're on your own. People usually buy batteries from grocery or drugstore racks. Asking a clerk which battery is best for your digital camera will probably earn you only a glazed look and a shrug.

This lack of information is really too bad, because given the way battery lines have been expanding in recent months consumers could use some direction. Suddenly, each of the big three battery makers—Duracell, Energizer, and Panasonic—is touting long-life batteries tailor-made for electronics.

Do they really perform better? Do they deliver enough extra juice to justify their higher price tags? And are they easy to find at the corner drugstore? With cash in hand, I set out to survey several local stores and scoop up their best batteries, then put them to the test during days of sightseeing and shooting on a conveniently timed trip to San Francisco. Once back home, I put them through further paces with an additional high-drain device

(a battery-sucking portable television) and a low-drain test using a cheap flashlight.

## Bucks for Batteries

First things first: If I was going to test the crème de la crème of long-life batteries, I needed to know what average batteries could do. I picked up some basic Duracell and Energizer alkalines, as well as RadioShack and IKEA store brands.

I bought four-packs of Duracell CopperTops and Energizer Maxes for \$3.99 apiece, and I paid \$8.99 for a 12-pack of RadioShack's Enercell store-brand double-As. The cheery yellow IKEA batteries seemed an even bigger bargain at \$2.99 for a 10-pack (and I've seen them on sale for \$2), but I suspected that they wouldn't stand a chance against the forefront of battery technology.

Today's phalanx of new batteries is actually a broad array of new and old tech. One of the three superbatteries I looked at, the Energizer e<sup>2</sup> Lithium, has been around since the 1990s but found a real purpose only with today's digital devices. The Duracell PowerPix and Panasonic Oxyride are more recent releases designed to meet the needs of high-drain devices.

Buying the high-performance batteries proved more of a challenge than expected. The first drugstore I tried, a Walgreens, offered a large rack of mostly Duracells that included some of the com-



pany's Ultra line but none of its PowerPix batteries. There were no Energizer e2 Lithium or Panasonic Oxide batteries to be found. Only as I was checking out did I notice the rack of high-performance batteries behind the counter.

That proved the rule in nearly every store. Common alkaline and store-brand batteries were easy to find, but the high-performance batteries were hidden away. In one Rite Aid, alkalines were located in a large, easy-to-spot aisle rack, photo batteries and a few long-life batteries sat on a counter-top display, and the other long-life batteries were hanging on a wall behind the photo counter. That's the first place you'd look, right?

Theft deterrence is likely the reason for the separate racks. PowerPixes cost about \$7, and e2 Lithiums are quite pricey—almost \$10. Although theft is no doubt a problem, separate racks create another issue: Before deciding which batteries are best for their cameras and remote-control Lamorghinis, customers need to be able to find all the choices. I have a feeling many people buy lower-performing alkalines simply because they can grab them easily on their way to the checkout counter.

#### Shooting Spree

To put these batteries through their paces in some realistic conditions, I picked up a Kodak EasyShare C360 and first tested the control batteries

around New York City. Having strong batteries is important, I discovered, since they not only determine how many pictures you can take, but they also affect the camera's refresh rate. Nobody wants to lose out on a great shot because the digital camera is still processing the last image. I took most shots without a flash, and because I was shooting rapidly, my numbers are quite a bit higher than the battery companies' claims.

The IKEA batteries fared the worst, with only 209 shots; the Energizer Maxes got 309, Duracell CopperTops 327, and RadioShack Enercells a big 374. Taking that many photos on a pair of double-A's might sound like a lot, but it's chump change compared with the powerhouses to come.

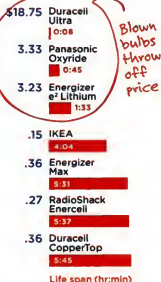
Next up were the long-life batteries, which I used while shooting like a crazed tourist on my trip to San Francisco.

First up was the Duracell Ultra, which is simply an alkaline battery created with an improved manufacturing process. Duracell also makes a line called PowerPix, which is recommended for heavy shooters, but I stuck with the Ultra line, which was easier to find, to see what a high-performance alkaline battery could do. The Ultras lasted for 522 pictures (about half a cent per shot), giving me more than enough power to shoot every monument, museum, and arresting view in the downtown area.

#### COST PER HOUR



Ultra Hardware Heavy-Duty Flashlight  
Batteries needed: 2 AA



## DIGITAL CAMERA TESTS

		Cost for 2 batteries	Number of shots	Pix per penny
	Duracell CopperTop	\$2.00	327	1.6
	Duracell Ultra	\$2.50	522	2.0
	Energizer e <sup>2</sup> Lithium	\$5.00	2,676	5.4
	Energizer Max	\$2.00	309	1.5
	IKEA	\$0.60	209	3.5
	Panasonic Oxyride	\$2.50	989	4.0
	RadioShack Enercell	\$1.50	374	2.5

My next contestant was the Panasonic Oxyride. The Oxyride is similar to a standard alkaline, but it uses an oxy-nickel hydroxide chemical process to generate more power, and it's made with a vacuum process that also enables more power. It produces a 1.7-volt discharge, rather than the 1.5-volt discharge of typical double-A's, and this yielded noticeably shorter camera refresh times. Oxyrides typically cost more than alkaline batteries, but they live up to Panasonic's performance claims. I squeezed 989 shots out of a pair of double-A's (that's one-fourth of a cent per shot), which capably carried me through Chinatown and Fisherman's Wharf.

Last up was the heavy hitter, the Energizer e<sup>2</sup> Lithium. The e<sup>2</sup> is made differently from tradi-

tional batteries (see the sidebar) and costs more, so I was curious to see if it would deliver.

I didn't have to wonder for long. The e<sup>2</sup> simply didn't stop, taking me through the Haight-Ashbury and every inch of Golden Gate Park, and even into a local dive for a little Sonoma white at the end of the day. In the end, I took 2,676 shots using two e<sup>2</sup> batteries (one-fifth of a cent per shot), which makes them the best choice both for skinflints and for people who don't want to change batteries often. But they aren't without flaws. The e<sup>2</sup>s deliver only 1.3 volts, which causes noticeably slower refresh times. That's a nuisance when you're trying to shoot quickly.

## TV, Timed

With better refresh rates and good value, the Panasonic Oxyride was my favorite for digital photography. I was surprised when it didn't do as well in a second test, powering the biggest battery vampire I could think of: an RCA portable television running off three double-A batteries. The IKEAs worked for 4 hours, the Duracell CopperTops for 4 hours 4 minutes, the Energizer Maxes for 4 hours 7 minutes, and the RadioShack Enercells for 4 hours 8 minutes. As for the high-performance batteries, the Duracell Ultras ran for 4 hours 45 minutes and the Energizer e<sup>2</sup> batteries for 6 hours 15 minutes, but the Panasonic Oxyrides lasted only 3 hours 40 minutes. That's worse than any of the control batteries. What gives?

Then, just for kicks, I ran a battery test with a low-drain device, a flashlight, and the results were surprising. The low-end batteries all (except the slightly shorter-lasting IKEAs) powered the flashlight for more than 5 hours of constant use, while the high-performance batteries all burned out the flashlight's bulb long before they were drained. The Energizer e<sup>2</sup>s lasted an hour and a half, the Oxyrides 45 minutes, and the Duracell Ultras a scant 8 minutes.

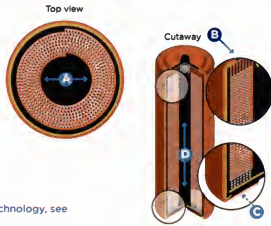
The lesson is simple: Buy the right battery for the job. Long-life batteries deliver too much power for low-drain devices. Looks like there's some truth to the marketing hype after all.

Though the overall winner isn't clear-cut, it is clear that long-life batteries designed for digital gear offer good value and convenience—for digital cameras. They're more expensive, but they'll last forever—particularly the Energizer e<sup>2</sup>. Buying strictly based on cost? If you can find the IKEAs at \$2 per 10-pack, don't hesitate to buy. When they're that inexpensive, the cost per shot matches that of the long-life Oxyride, and they outperformed everything else on our extreme TV run-down test, at just 19¢ for an hour of viewing. And one other thing I learned: If you're going to shoot thousands of photos while walking around all day, wear comfortable shoes. □

## HOW IT WORKS

The new Energizer e<sup>2</sup> Lithium battery

Energizer refined 110 years of battery design into a lithium iron disulfide blend and a distinctive spiral construction, or "jellyroll" (A). The cathode (B) and anode (C) layers connect to the positive and negative terminals and are spiral-wrapped to provide more surface area for the electrode (D).



For more info on battery technology, see [go.pcmag.com/batteries](http://go.pcmag.com/batteries).



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## A DIY MP3 Boom Box

*We're still waiting for Hollywood to remake Say Anything, but here's our update of the classic 1980s stereo.*

BY BILL MACHRONE

**Y**OU'VE DOUBTLESS SEEN THE IPOD HI-FI. Apple's supposed boom box, by now, and you've probably also realized that it's nothing of the sort. It's a tabletop audio system, less likely to venture outdoors than a New York City house cat. Why would Apple want to make a boom box anyway? You'll recall that in their heyday boom boxes were widely reviled, seen as an assault on the senses and a way of imposing one's musical tastes on others who likely did not share them.

Sometimes you want your music to fill a room, though, or to make it portable and listen to it in situations where earbuds just won't do. With that in mind, I developed the iBoom Lo-Fi, a portable music player that's more boom box than hi-fi. I found an old boom box, gutted its cassette player, and adapted it to hold an iPod instead. The result is a portable music player with a stealthy secret—its high-tech payload isn't obvious unless you spy the iPod inside the cassette compartment. I designed it so that the cassette transport buttons now control the iPod. That way, you don't have to reveal your cargo to start playing or to forward to the next song.

Unlike the iPod Hi-Fi (which leaves your iPod exposed to the elements), the iBoom Lo-Fi completely encloses and protects the iPod, so you can take it to the beach, on a picnic, or just to the kitchen while you paint the trim. You too can build an iBoom; it takes a minimum of tools and a bit of ingenuity. I budgeted \$50 for this project. It came in at \$46.

## Putting It All Together

You don't need a shop full of tools to do this kind of modding. The artful hacker can get by with a fairly modest collection of hand tools. A Dremel MultiPro or similar rotary tool is a nice addition for serious modding, yet it won't break the bank. Get a three-jaw chuck and an assortment of cutters for maximum versatility. You don't need a benchtop milling machine like mine, but it sure speeds some operations. Here's my list of essentials:

### TOOLS

Set of Phillips and straight-blade screwdrivers	Razor saw
Jeweler's screwdrivers	X-Acto or hobby knife
Long-nose pliers	Soldering iron
Wire cutter/stripper	Electric drill
Hacksaw	Set of drills
Files	Bench vise
	Magnifier
	Digital multimeter



### SUPPLIES

- Solder
- Hook-up wire
- Filled epoxy, such as J-B WELD or PC-7
- Heat-shrink tubing
- Aluminum bar stock and angle stock
- Sandpaper, various grits

*A cheap multimeter is a crucial tool.*

## Looking for Mr. Good Box

*other models will probably have similar guts.*



**1 Clean up.** A little soap and water, and I was no longer averse to touching the boom box, which takes six C batteries. Its power cord and battery compartment cover were both present.

**T**HE FIRST STEP IS TO FIND A SUITABLE boom box. I didn't want a huge one with attendant chrome, VU meters, lights, monster speakers, and an insatiable thirst for D cells. A small Sanyo unit, model number M7024A, was perfect. It had stereo speakers, AC/battery operation, decent tone, and AM/FM radio. In your search, pay attention to the size of the cassette compartment. The iPod is slightly longer than a cassette, and you'll have to remove some plastic to make it fit. You'll also need room for the plug that powers the audio and controls, so choose a player with a cassette compartment that is wider than a cassette. (Thrift stores and garage sales are good sources.)

Make sure you get a power cord, or if you don't, make sure the boom box uses a common type and not a proprietary connection. Don't be dissuaded if it's dirty or funky. Like a pug, ugly is beautiful. But clean the boom box before you dive in. Except for some dust and a missing knob on the power switch, this 1980s-vintage Sanyo radio cassette player is in good shape. The cassette area is wider than a cassette, allowing extra room for the iPod.

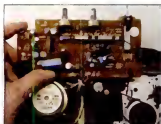


**2 Take stock.** The goal: make the iPod fit into the cassette compartment, complete with electrical hookup. The iPod is just a bit longer and thicker than a cassette.



**3 Crack it open.** Sanyo on the half shell: Disassemble on an old towel, so parts don't roll, bounce, or otherwise disappear. This unit is nicely modularized, perfect for the project.

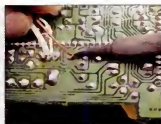
## Disassemble the Boom Box



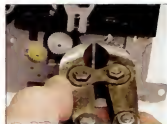
**1 Know your board.** The audio board has a power switch at the upper right, and volume and tone knobs at left. This board powers on when you turn on the radio or press the Play button on the cassette mechanism.



**2 Find the head.** Here's the cassette mechanism (minus the motor). The central head is the playback/record head. Follow the wires from this playback head back to the audio board.



**3 Unsolder wires.** Mark the location of the left/right channel wires and the ground carefully and unsolder the wires from the audio board. These circuit points will become the input from the iPod.



**4 Destroy.** If you can't remove the cassette mechanism entirely, remove any shafts or pins that stick up into the cassette compartment. This chomper easily devoured the little parts.

*Note:  
The moving parts  
are mere clutter.  
Clean shop.*

IT'S A GOOD IDEA TO TAKE DIGITAL PHOTOS OR make a sketch as you disassemble your boom box so you know where everything goes when you put it back together. Pay attention to screws of different lengths, and mark where they go. My Sanyo was pretty much ideal—it had separate audio and tuner boards, with all of the cassette electronics on the audio board. The apparatus was entirely mechanical too. Be careful, because the soldered connections where wires run off the board can be delicate.

The Sanyo's tape player was operative only when the function switch was off. The two "on" positions selected AM or FM radio. The Play but-

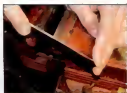
ton actuated a switch that turned on the audio. Since my iPod would substitute for the cassette player, I'd need to add a switch to power on the iPod. A mechanical connection from the Record button turned on the erase head and the record circuitry. Its natural state was off, so I didn't need to do anything about it.

Trace the wires from the cassette board mechanism to the audio board. You should find one wire that goes to the erase head and one that goes to the playback head, which doubles as the record head on inexpensive players. You can unsolder the erase-head wire, but take note of where the playback-head wire goes.

## Make Your Own Buttons



**1 Make a plan.** I had decided to mount the Sanyo's stock buttons on switches and create a bracket from hardware-store aluminum to hold the assembled controls. The Record button will be the power switch.



**2 Shrink the buttons.** Little plastic tabs attached the buttons to the tape control mechanism. This setup interfered with my plan, but a razor saw helped get rid of the extra plastic.



**3 Fill 'er up.** I filled the hollow buttons with epoxy so I could drill into something solid. The switches will mount in the drilled holes and support the buttons. Aluminum-filled epoxy cures fast and machines well.



**4 Go high-tech.** A Pop-sicle stick is a good applicator for a job like this. Keep the sheet of paper where you mixed the epoxy so you can monitor how much it has hardened.



**5 Smooth it out.** I used my bench-top milling machine to level the backs of the buttons. That was overkill; rough sandpaper works fine, though not as quickly. Don't use a file—the epoxy can clog it.

*Epoxy is messy,  
but effective.*

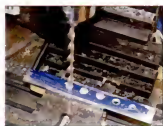
THE SIMPLEST WAY TO CONTROL THE IPOD would be to buy an in-line wired remote and mount it on the boom box with its buttons accessible. That would have been antithetical to my design, though, and the Apple remote was too expensive anyway. Besides, the Sanyo already has such nice control buttons.

I chose to use a cheap wired remote that plugs into the headphone jack rather than one that uses the base connector. All I had to do was tap into its circuit board and bring out the switch connections, which could then connect to the buttons on the Sanyo. It's just that simple, right? First we'll customize the buttons on the Sanyo. Then we can wire up the circuitry.

## Switches and Electronics

**B**ECAUSE THE IPOD LIES ON ITS SIDE INSIDE the cassette compartment, the plug-in style makes a better connection. Dock connectors give you more options, such as charging the iPod, but either they lack remote buttons or the remote is wireless (as with the Xitel HiFi-Link). After some online searching, I found a third-party controller on sale for \$7. You might find it at full price for \$8.99. Now it's time to open it up, tap into its circuit board, and bring out the switch connections. Real hardware hackers would consider that cheating, but a programmable microcontroller plus programmer and development software would have put me way overbudget.

*Apple's control costs about \$39. This knockoff is virtually identical.*



**1 Mark and drill.** Make a suitable support for the switches. Always clamp before you start to drill. If the drill catches, the pieces can turn into whirling finger-breakers.



**2 Fit and mount.** I used aluminum angle stock to make L-brackets to mount the switches. Try it out before you bolt it together. Here, the trial fit looks good.



**3 Remove the board.** The microcontroller reads the buttons and converts the presses into serial pulse trains that the iPod understands. The control codes are well documented on the Web.



**4 Trace the circuits.** On the other side of the circuit board, simple dome membranes are taped over the switch contact elements. I traced the circuits so I could replace the switch matrix with my control switches.



**5 Solder on wires.** You need only five wires for all five switches, because the switches are in matrix. I soldered them into the plated-through holes on the circuit board.



**6 Control power.** The push on/push off power switch I installed wouldn't latch, so I was off to RadioShack for a new switch. At first blush, it looks totally unsuitable. The red button pulls off and exposes an actuator post, but it's not long enough to insert into the cassette button.



**7 Hone the switch.** *Solution.* Reduce the amount of plastic surrounding the post. I attacked the bezel with my trusty razor knife and cleaned it up on the milling machine. (I could have used a file, but I was pressed for time.) Finally, I smoothed the rough edges with a hot knife.



**8 Assemble it all.** I had to notch the button to fit over what remained of the switch body. Heat-shrink tubing keeps the wires neat. The switch unit is ready to be installed.



## Fix the Door Latch

Here's our makeshift door release.



**1 Craft a door lever.**  
The door latch went away with the cassette mechanism, so I bent up a new actuator out of brass rod. I silver-soldered a small brass washer to keep the rod aligned with the cassette door. The angled hook holds the door closed.

**2 Allow for motion.**  
I made a guide out of two pieces of aluminum angle stock and drilled a hole just below the power switch in the case. Then I notched the side of the housing. When the rod is pushed in, it slides down the notch and releases the door.

**U**LTIMATELY I PUT FAR MORE WORK INTO the physical mods than into the electronic adaptations. I removed as little plastic as possible, to retain strength, so thinning the sides of the cassette door was a tedious cut-and-try job, with frequent stops to vacuum fine shavings.

The completed iBoom Lo-Fi sure looks good, and it has already provided some enjoyable hours of portable music. It weighs in at a relatively light 4.7 pounds (with batteries and iPod on board)—a far cry from the hefty iPod Hi-Fi's 16.7 pounds. I hear more background hiss in the amplifier than I'd like, but high fidelity was never the goal. In fact, the iBoom sounds surprisingly good, considering the 1980s technology. Are you up to the challenge of making your own?



**3 Seal and spring it.**  
Next I glued a piece of plastic over the notch to keep the actuator rod in place. Then I added a spring to make the mechanism self-latching when you close the door.

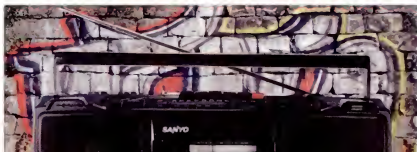
**4 Make way for cabling.**  
The Dremel MultiPro is handy for hogging out larger pieces of plastic, or, with an optional three-jaw chuck, for drilling small holes. I had to remove a large hunk of plastic to clear the audio/control cable.



**5 Hook it all up.**  
I needed a short stereo cable to go from the Sanyo's audio board to the remote control. The iPod's headphone output is too hot for the playback head input, so I added a 330,000-ohm resistor to each channel.

**6 Protect the remote.**  
The remote-control circuit board is sandwiched between two pieces of foam, securely nestled between the shell of the boom box and the cassette well. Plug in the iPod, and you're all set!

**WIN THIS HACK!** You'll save money building your own boom box rather than buying one from Apple, Bose, or JBL, but you'll save even more money if you simply win the one we've already built. Plus we'll throw in an iPod for good measure. Enter the contest at our Web site and savor that winning feeling. [go.pcmag.com/diy](http://go.pcmag.com/diy).



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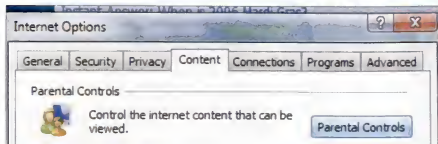
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**PARENTAL CONTROLS** The easiest way to get to parental controls is from the Internet Options Control Panel applet. You can also access the applet from Internet Explorer's Tools menu.

Choose a user and set up Parental Controls  
What can I do with Parental Controls?

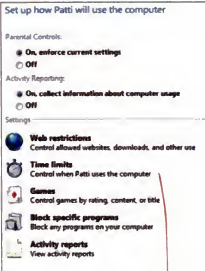
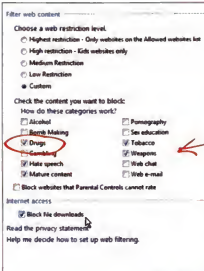


**LIMITED ACCOUNTS ONLY**  
You can apply parental controls only to Limited user accounts, not to accounts with administrator privileges.

Works in Firefox, too



• Web page contains: Drugs



## Child-Proofing Windows

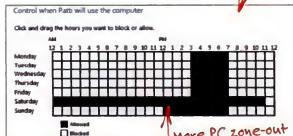
I'M NEITHER A PARENT NOR A PURITAN, BUT I CAN THINK OF PLENTY of things on the Web I wouldn't want kids to stumble onto prematurely. Concerned parents have long been able to install third-party Web-filtering and monitoring tools to help keep their children away from violent content, porn, adware-laden downloads, and the like—even just to restrict computer use to certain times of day. With Windows Vista, Microsoft is building these controls right into the OS. It's too early to judge their effectiveness, but here's a glimpse of some of the new tools.

You can restrict PC use in various ways: limiting access to Web sites, allowing use only at certain times of day, or blocking specific programs (including games). You can also opt to track usage info and view activity reports.

If you turn on activity reporting, Vista tracks users' behavior in extensive detail. An overview page for each restricted user lists key metrics such as the top ten Web sites visited, the most recent sites blocked, the total number of log-ons, frequency of application use, and details of e-mail and instant-messaging activity.

The reporting is detailed enough that reviewing even my own usage logs felt a bit shameful, like peeking into someone's diary—it certainly raises questions about privacy and respect that would make a good topic for family conversation. But judging from the reactions of friends whom I've told about Vista's built-in parental controls, these tools will largely be a welcome addition to family computers.—John Clyman, contributing editor

**CONTROL OPTIONS** If you want to control access, you have a variety of options—perhaps too many. But if you're willing to wade through the details, you'll find you can set up whitelists or blacklists, or block content by category. Parental controls also let you prevent all file downloads.



### LOG-ON TIME BLOCKS

You can specify the times of day and days of the week an account is allowed to be logged on. When the end of a user's permitted time approaches, Vista pops up a warning.

» CAN'T GET ENOUGH VISTA?  
[go.pcmag.com/vista](http://go.pcmag.com/vista)





## ASK LOYD HARDWARE

### UNREADABLE RAM

**Q** I added RAM (2 x 256MB) to total 1GB on my computer and ran the DirectX Diagnostic Tool to see if it picked up the new RAM, but it still says I have only 510MB. Do I need something to get it to show, or does DxDiag not read newly installed RAM?—Mike N.

**» NEED ANSWERS?**  
ExtremeTech.com's editor, Loyd Case, tackles your toughest hardware problems each issue. Send him yours at askloyd@ziffdavis.com

**A** Several things might be going on here. Some motherboards don't play well if you add memory to all the memory sockets. You need to look in your motherboard manual and check to see how many "banks" of memory it supports. Memory modules with chips on one side have one bank. If a module has chips on both sides, that usually means it has two banks. Some motherboards support a total of only six banks of memory, or even less.

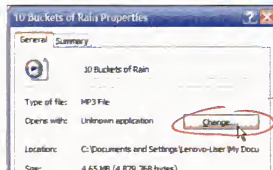
So if your existing memory already used four banks and you installed two more double-banked modules, that memory may not be visible. Or it may simply run more slowly.

Of course, there's always the possibility that your new modules are defective. You might try pulling your old modules out to see if the new ones actually work.

### HIJACKED FILE ASSOCIATION

**Q** Somewhere along the line, my music file association was hijacked by some program that I no longer have on my system. My files play fine in WMP, and they'll open in WMP, but they do not have a WMP icon. When I navigate to a music folder and click on "Play All" in the left-hand task column, nothing happens. What do I do to get this function back?—Randall Koller

You can change a file association by right-clicking on the file and working from the Properties screen.



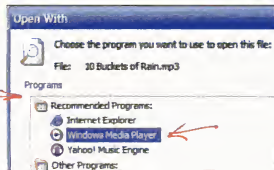
**A** From your description, it sounds as if you're using Windows XP. If so, you first need to navigate to a folder that contains your music files. Click on one to select it, but don't double-click. Now, right-click on the file and select *Properties*. You should see a screen that looks like the first screen shown below. Click on *Change*. Now you can navigate down and select the correct program to associate with your music file, as in the second screen. Don't forget to press *OK* in this screen and *Apply* in the property screen!

### GAMING AT WORK

**Q** I have a question that involves using my PC at work in an unsupported way. I work third shift, and have a lot of time to kill. I have a game that I play in my spare time at home and would like to be able to play it at work.

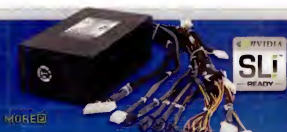
The problem is that the game requires 3D video acceleration, which my work PC does not have. I don't have admin privileges on this computer. I planned on installing the game on my external hard drive and plugging this into a USB port on the work computer. Is there a 3D graphics card available that is plug-and-play and external at the same time? I don't have the ability to install any software on the work computer's hard drive or I would just sneak a graphics accelerator card into the computer. Is there a solution?—Shawn O'Neill

**A** Shawn, apparently you're pretty sure that none of your coworkers read *PC Magazine*. Usually, we're all for sneaking in a little gaming time, provided you're not being unproductive or creating a potential safety risk. But, alas, we can't help you in this one. There is no external graphics hardware we're aware of that would do what you want it to do. If you can't open the box, install the card, and then install the driver for that card, then you'll just have to play Minesweeper. □



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## ASK NEIL SOFTWARE

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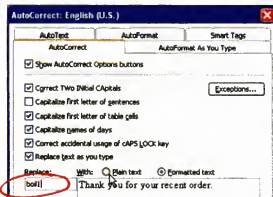
**Q** *I want to insert multiple Microsoft Word 2003 files into one document to create a report from boilerplate text. I know that I can use Insert | File and hold the Ctrl key down to select multiple files. But the files don't appear in the order I selected them, and I can't find a workaround. Is there a way to make this work? It will save me a lot of time if I can use clicks to assemble my documents.*—Peter Crisp

**A** Microsoft Windows doesn't have any memory for the order in which you Ctrl-click files, so you're going to have to find another way to accomplish what you want. I considered the Master Document feature, which lets you assemble one main document from any number of subdocuments. But in the end, it didn't seem any easier than inserting your files one at a time in the desired order.

Instead, I'd suggest you define an AutoCorrect entry for each existing boilerplate file. Open the file, press Ctrl-A to highlight all its text, and select Tools | AutoCorrect Options from the menu. You should see the start of the file's text in the With box. Enter a keyword such as *boil1* in the Replace box, choose whether to include formatting, and click Add. Repeat for the other files. You can keep a printed key handy to remind you which keyword yields which

After defining AutoCorrect entries representing large chunks of boilerplate text, you can create a standard report simply by typing a few keywords.

Define your AutoCorrect entry



boilerplate text. Now to write a report you'll simply type something like *boil1 boil4 boil7 boil9*, and Word will fill in your boilerplate text.

### DOWN WITH UGLY EXCEL CHARTS

**Q** *I really dislike the way that Microsoft Excel charts have a default color of gray. Most times I need the chart background to be white. I know how to change it; right-click the chart, select Format Plot Area, and select None in the Area panel. Is there a way to make this the default?*—Michelle LaPointe

**A** Fortunately, it's quite simple. First, create a chart and configure it to exactly the way you want it to look. Colors, label alignment, number formats—set all of these just the way you like them. Select Chart | Chart Type from the Insert menu and click the Custom Types tab. Click the User-defined option at lower left, and click the Add button that appears. Enter a name and description for your chart type and click OK. If you wish, click the Set as default chart button. You can create as many custom chart types as you like—you may want to design your own versions of the line chart, bar chart, and pie chart, at least.

### OPEN WITH FIREFOX

**Q** *How can I add a right-click context menu "Open with" so I can open Internet Explorer shortcuts on the desktop with Firefox? IE is my default browser, and I don't want to change that. I know I could drag the shortcut and drop it on the Firefox icon, but I was hoping for something more in the shape of a Registry hack.*—Farhad Vesuna

**A** One Registry hack coming up, fresh from the oven! Launch Notepad and enter these five lines:

#### REGEDIT4

```
[HKEY_CLASSES_ROOT\InternetShortcut\shell\FoxOpen]
@="Open with Firefox" [HKEY_CLASSES_ROOT\InternetShortcut\shell\FoxOpen\command]
@="C:\Program Files\Mozilla Firefox\firefox.exe" %* %1"
```

If your installation of Firefox is in a folder other than C:\Program Files\Mozilla Firefox, you'll have to edit that last line to match. Do notice the dou-

ble backslashes (\). Save the file as "FoxOpen.reg", including the quotes so Notepad won't be tempted to call it FoxOpen.reg.txt. Now double-click the file you just created, answer Yes to the confirmation prompt, and click OK. The job is done. From now on when you right-click a URL shortcut, you'll have an *Open with Firefox* option. You can even right-click a link in Internet Explorer's Favorites menu and use your new menu item to open that link in Firefox!

#### DON'T MISS OUTLOOK MAIL NOTIFICATIONS

**Q** I'm using Windows XP Home Edition and Microsoft Outlook 2002. When I receive mail in my inbox, a message window is displayed that says new mail has arrived. Is there a way to get this message window to be displayed even after the screen saver has darkened my monitor? In other words, is there a way to have the message disable (or override) the screen saver?—George de Alcalá

**A** I don't know of any way to make the new-mail pop-up halt the screen saver. Your best bet is to set the Desktop Alert to stay vis-

ible long enough that it will still be there when you return to the computer. Outlook limits the alert duration to 30 seconds, but a Registry tweak can set it for much longer. Launch Regedit from the Start menu's Run dialog and navigate to the key `HKEY_CURRENT_USER\Software\Microsoft\Office\11.0\Common\DesktopAlert`. Look in the right-hand pane for a value named `TimeOn`. It probably won't be there; in that case, right-click in the right-hand pane, choose *New | DWORD value*, and name the value `TimeOn`. Now double-click it and click the *Decimal* option. Type in a value equal to the number of milliseconds you want the alert box to remain visible. There are 86,400,000 milliseconds in a day, so that's a good value to use. Click OK and close Regedit. You may have to restart Outlook before it will notice the change. But now the desktop alerts will remain visible for a whole day (or until you click the little X icon at top right).

Another option that you might want to try is to use an e-mail notification and retrieval program such as ePrompter ([www.eprompter.com](http://www.eprompter.com)), which displays the number of new messages from up to 16 e-mail accounts from different providers on its own screen saver. □

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# Your Backup Battle Plan

*A disciplined approach to backup is crucial to keeping your business up and running.*

BY MATTHEW D. SARREL

**I**N 1876, LIEUTENANT COLONEL GEORGE Custer led a small force of soldiers against an overwhelming force of Lakota Sioux and Cheyenne warriors at Little Bighorn. Reinforcements were on the way, but Custer thought he wouldn't need them. Everyone knows what happened to Custer. The moral of his story is that no force can succeed if it stands alone and outnumbered. The same is true of your business's data: Without a solid backup plan, you just might be making your last stand.

An effective data backup strategy means knowing what needs to be backed up, including regulations such as Sarbanes-Oxley and the Health Insurance Portability and Accountability Act (HIPPA), which have specific backup requirements. You should also determine whether data should be *backed up* or *archived*. Most businesses do both. *Backups* are copies of active data for short-term use and are frequently overwritten with updated versions. The three types of backup are *full* (which backs up all files regardless of whether they have changed), *differential* (which backs up all files modified since the last full backup), and *incremental* (which backs up only files that have changed since the last backup of any kind). *Archives*, on the other hand, contain static data, such as inactive document files and old e-mails.

Most SMBs use tape for backup and archiving. Devices from Imation, Quantum, Sony, and others have become the standard to back up, recover and archive data. You can combine backup strategies to create a tape-rotation schedule. (For examples of tape-rotation schedules, visit [go.pcmag.com/backupmethods](http://go.pcmag.com/backupmethods).)

Although tape is still reliable, backup to disk, CD, DVD, or to a remote storage facility can reduce cost and decrease backup and restore time. Traditional backup uses both software and backup media. Software such as Symantec Backup Exec runs about \$500 plus the cost of agents for specific tasks.

Online backup services can be a powerful option for small businesses. The advantage is that your data is protected in a secure off-site facility in case your network is compromised or your office is damaged. You'll need high-speed Internet access, and the backup process will be much slower than local backup. Look to services that use file encryption during transmission and storage. Such services can be expensive; prices are based on storage space and timeliness of backups, varying widely from \$180 for 1GB of data to \$995 for 2GB. You should choose this method only if you have a healthy budget and need fast recovery. Some of the services here include Iron Mountain Digital's LiveVault InSync, @Backup, Iomega's IStorage Online, and Xdrive.

A method rapidly gaining ground is disk to disk (D2D) or its extension, disk to disk to tape (D2D2T). As the price of hard drive space decreases, this becomes a more attractive option, primarily because it's fast. Complete copies of data are created on another drive, and then you can create a traditional backup of that drive. You'll need an external or additional internal hard drive. You should also look to a network-attached storage device, such as the Buffalo TeraStation (\$995 list), which lets you access your files on your company network. □

Matthew D. Sarrel is a consultant and former PC Magazine Labs technical director.

## BACKUP TECHNOLOGIES COMPARED

Technology	Applications	Ideal office environment	Pros	Cons	Cost
<b>CD/DVD</b>	Data archiving/migration. Off-site storage.	Small-office and single-server environments.	Low cost. Portable. Common I/O interfaces.	Limited capacity. Slow read/write speeds.	\$
<b>Tape</b>	Off-site storage. Data archiving.	Any size office that can handle tape-rotation schemes.	Low cost. Portable. Large capacity.	Slow restore speeds. Tapes degrade over time.	\$5
<b>Online Storage</b>	Off-site storage. Disaster recovery.	Offices that require disaster recovery preparedness.	Off-site. Most are configurable via a Web interface.	Limited by bandwidth of Internet connection.	\$55
<b>Disk-to-disk-to-tape (D2D2T)</b>	Incremental backups. Storage virtualization. Off-site storage.	Offices with big budgets that need lots of data backed up or restored quickly.	High read/write speeds. Redundancy.	Complex to set up. Expensive.	\$555







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# Name That Virus

The inability of antivirus and security companies to agree on common names for viruses can confuse users.

## A SHOT IN THE PC

- 1 Make sure your system has antivirus software**, a personal firewall, and separate antispyware protection (if that feature is not available in the antivirus package).
- 2 Find a trustworthy browser password manager**, such as those built into Firefox, Safari, and Internet Explorer.
- 3 Don't open unexpected attachments from anyone**, and beware of visiting unknown Web sites.
- 4 Keep up to date on known methods of attack**. There's an arms race in computer security, and having the latest knowledge can make all the difference.
- 5 When antivirus firms warn of an epidemic, check the CME identifier (cme.mitre.org)**, not the names used in the media and antivirus alerts.

BY ROBERT LEMOS

**C**ARL LINNAEUS WOULD be disgusted by today's virus alerts. The 18th-century botanist herded the scientific community of the day into accepting his hierarchical classification system for plants and animals. Thanks to Linnaeus, scientists today can discuss living things using a shared nomenclature.

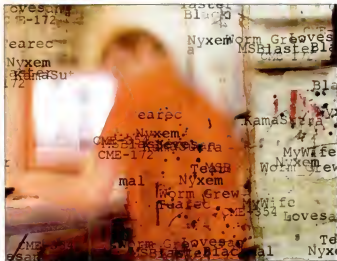
Not so in the digital world. In January, when a new computer virus appeared on the Internet, antivirus companies rushed to issue alerts, inundating consumers with a confusing array of names for the same threat: Blackmal, KamaSutra, MyWife, Nyxem, Tearec, and Worm\_Grew. This had many users wondering whether a deluge of viruses had risen to attack their PCs.

The incident was an extreme case, but not an uncommon one. Antivirus companies frequently assign different names to a single threat. Sometimes, the disagreements are small, such as whether the latest attack is the *E* variant or the *F* variant of a virus. In other cases—such as with the MSBlast worm, which was also called Blaster and Lovesan—the names can be quite different.

Most users don't care about what security folks name the latest virus. But when epidemics happen, cutting through the confusion can be important, especially if you don't regularly update your antivirus software. The Babel of names makes it hard for security firms and incident responders to communicate to users the best way to avoid infections.

Consumers won't get relief from the jumble of names any time soon. Thanks to the Internet, the hundreds of new threats that appear every month pop up simultaneously across the world. Seldom does a single antivirus firm actually break the news of a new virus discovery and thus stake a claim to the name. Instead, the companies all find a threat at about the same time and focus more on protecting their customers than on harmonizing on a name.

Adding to the confusion, each security company sees a major marketing windfall in



getting the media to quote its name for a virus. That incentive makes it more unlikely that rivals in the antivirus community will agree on a single name.

A recent system aims to cut through the confusion. The Common Malware Enumeration (CME) Project assigns a random identifier to major threats to help responders unify on a name. Rather than Blackmal, Nyxem, or KamaSutra, responders used CME-24 to talk about that virus.

An array of numbers, however, isn't much more helpful for PC users. As more virus threats get a designation, users will have to figure out the differences among CME-24, CME-354, and CME-172.

Instead, antivirus firms and others should take another page from Linnaeus's notebook. The botanist was also responsible for the binomial system, which simplified all plant names in the taxonomy to two parts, the genus and the species.

In the end, confusion compromises security. With PC users increasingly becoming the focus of attacks via social engineering, keeping security simple should be a top priority for security firms. □

Robert Lemos is a freelance technology journalist and the editor-at-large for SecurityFocus.

## EPIDEMIC OF NAMES

In January a major virus, widely known as Kama Sutra or Blackworm, caused alarm. Here are some of the other names security firms used.

Security Firm	Virus Name
F-Secure	Nyxem.E
Kaspersky	Nyxem.E
McAfee	MyWife.D
Microsoft	MyWife.E
Panda Software	Tearec.A
Sophos	Nyxem.D
Symantec	Blackmal.F
Trend	Worm_Grew.(A,B)

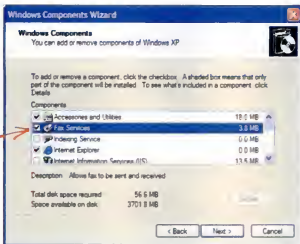
Sources: Symantec, Zone Labs, 2006.

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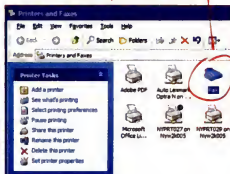
**1. ADD FAX SERVICES**

Navigate to Control Panel | Add or Remove Programs, then click Add/Remove Windows Components. *Windows XP Setup starts. Place a check next to Fax Services, click Next, and follow the prompts.*

*Hidden in plain sight*



*The fax is a printer driver!*

**2. CONTROL PANEL**

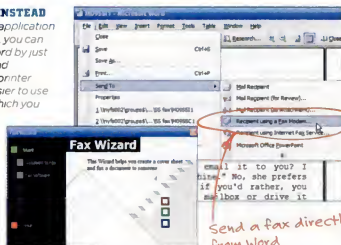
When the wizard finishes, a Fax item is added to the Printers and Faxes control panel. If you just want to send a note on a cover sheet, double-click the Fax icon.

**3. START A FAX**

The first time you use the Fax, you'll be prompted to enter the information that you'll want to appear on your fax cover sheets.

**4. FAX FROM WORD, INSTEAD**

As with any Windows application that supports printing, you can fax from Microsoft Word by just selecting File | Print and choosing Fax as your printer. But you may find it easier to use Word's Fax Wizard, which you can access through the File menu's Send To option.



*Send a fax directly from Word*

## How to Fax from Your PC

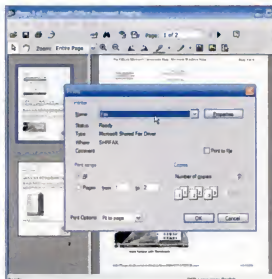
BY JOHN BRANDON

**Y**OU CALL YOUR ATTORNEY TO ASK HER TO REVIEW A CONTRACT, and she says, "Sure. Fax it over." "But it's a Microsoft Word document," you say. "Can't I just e-mail it to you? I don't have a fax machine." "No, she prefers fax. Or, she says, if you'd rather, you can drop it in the mailbox or drive it over. Grrr!"

But wait! You probably do have a fax machine and don't even realize it. It's right in your PC. You may have forgotten this if you've moved to broadband, but most computers still ship with fax modems. And Microsoft Windows XP includes fax software, although you may not have realized that either, since it's not part of the default installation. Fortunately, installing it is pretty painless. You'll also need a phone line near your system. If there isn't one there already, you can run a long extension cable, have the phone company install a jack, or use a device like the GE InstaJack, which lets you easily extend your phone lines over your AC wiring.

Why not use an Internet fax service? Well, services such as Efax.com start at about \$13 per month for sending, and a desktop fax is almost free (you'll be charged for long-distance faxes). Desktop faxing also saves time: You can resume important tasks while your modem processes the transmission. It's faxing at your fingertips, and you've been able to do it all along. □

John Brandon is a freelance writer based near Minneapolis.

**5. FAXING PAPER**

Sometimes you still need to fax good old paper documents. Just scan them in using the Microsoft Office Document Imaging utility, then print them to the Fax printer.

# Toolbar Review

There has never been a better time to use a toolbar with your Internet browser. Toolbars can provide users with numerous features such as Pop-up Blocking, Driving Directions, Adult Content Filtering, Security Features, Spyware Detection, Games and more. Toolbars are a convenient and powerful addition to your browser, making it easier than ever to navigate the Internet.

The comparison chart below will help you decide which toolbar is right for you.

Toolbar Comparison Chart				
Toolbar Features:	Advanced Toolbar	Google	YAHOO!	msn
Search Engines	100+	1	1	1
Search Tabs	✓			
Blocks Pop-Up Ads	✓	✓	✓	✓
Calendar Application	✓			
RSS News Reader w/Ticker	✓			
Auto Form Filler	✓	✓		✓
Adult Content Blocker	✓			
Spyware Remover	✓		✓	
Homepage Protector	✓			
Browser Tracks Eraser/Cleaner	✓			
File Shredder	✓			
Add Buttons for Software	✓			
Add Buttons for Webpages	✓	✓	✓	
Screensaver Launcher	✓			
Games Links	70	0	10	10
E-mail Provider Links	52	0	1	1
News Provider Links	88	0	1	0

With its vast array of features and incredible ease of use, the Advanced Toolbar stands out from the competition. It's a powerful web tool that allows you to choose from over 100 search engines, 80 plus news sources, 50 plus email providers and can be completely customized to meet your needs. The Advanced Toolbar does not record any user data, has a very straight forward privacy policy and is totally spyware and adware free. You can get a free copy of the Advanced Toolbar at <http://www.advancedtoolbar.com> and take advantage of everything this incredible toolbar has to offer.



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## The Holy Trinity

*The faithful eagerly await the second coming... of the next-generation gaming systems.*

BY CHRIS KOHLER, 1UP.COM

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Get the inside scoop on the gaming world, as well as all the news and reviews you can sink your teeth into, at [www.1up.com](http://www.1up.com).

**W**HAT'S GOING TO HAPPEN as the next-generation gaming hardware war plays out? Every console maker knows the importance of cultivating hype well in advance of hardware launches. It's not just about getting fanboys on message boards in a twist; manufacturers need to build a rep with John Q. Public as well. The war is raging toward its first three-console holiday season. Here's the scoop on the Big Three consoles.

### Xbox 360

Let's start with Microsoft's next-gen system, the only one you can buy today. Theoretically, anyway. Microsoft's inability to get Xbox 360s into stores has been the subject of much chatter since the system's November launch. That's changing though, and with Sony delaying its ship date for the PlayStation 3 until November, the Xbox 360 has a chance to gain significant market share.

Xbox evangelist-in-absentia J. Allard told game developers that the Xbox 360 would be *the* wireless,

always-connected console of the HD era and the remixed generation. And, sure enough, its hardware is built around that threefold philosophy. Games output at a minimum of 720p, gamers are logged on to Xbox Live automatically, and basic service is free. Users can easily rip music, video, and pictures to the hard drive and then connect to a Media Center PC.

Microsoft has also made risky decisions about high-definition video. It is well known that Sony's PlayStation 3 will use the Blu-ray hi-def movie format. Many people assumed that Microsoft would go with the competing HD-DVD format—but that's just a regular of DVD drive in the Xbox 360. Will this decision allow the 360 to offer competitive content and keep a price well below that of PS3? It's still up in the air.

## PlayStation 3

Overwhelming. Ridiculous. The hype over the PlayStation 3 is the rough equivalent of what might precede the Second Coming. With any luck, it will cover your house in warm, golden rays of divine joy.

What are people smoking, anyway? Early demos of PS3 games stunned audiences, but prerendered "target videos" probably won't reflect the final gaming quality.

For hype, Sony is relying mostly upon Blu-ray, the 25GB disc that's going to play the highest-def of all hi-def movies. Sony has good reason to believe that Blu-ray will drive PS3 sales; after all, the PS2's DVD player was very well received.

Can Blu-ray really do what DVD did? DVDs were a clear leap up from VHS tapes. But Blu-ray benefits only people with HDTV—a small minority of U.S. households.

## Revolution

Gamers are anticipating Nintendo's Revolution console primarily for one feature: its controller. They're eager to see what the gyroscopic position-sensing, one-handed, analog stick attachment, nicknamed the "nunchaku," can do for game design. The people at Nintendo are staying tight-lipped (not a single Revolution game has been shown so far), and both fans and detractors are upset. One thing is for sure, though: Nintendo has said, on the record, that the console won't support HD resolution.



**Nunchaku?** Nintendo's gyroscopic controller creates a buzz.

It's not unlike Nintendo to sacrifice extraneous features to keep prices low. Conventional wisdom says that by holding back features on the Revolution the company has taken itself out of the hardware race. Others say that this strategy might just draw Nintendo back into the thick of things. Many developers estimate that the Revolution's sticker price will be under \$199—and possibly even below \$149 or (admittedly unlikely) \$99. Will gamers trade HD for an extra \$200 in their pockets?

Nintendo's president, Satoru Iwata, has told a Japanese newspaper that the Thanksgiving holiday is an important target to hit in the U.S. market. □

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- 3 Far Cry** Some goons stole your sister. She's trapped.
- 4 Crysis** Battle your way through an alien invasion.
- 5 Half-Life 2: Episode 1** Further adventures of Gordon and Alyx.
- 6 Hitman: Blood Money** The Hitman franchise turns four.
- 7 City of Heroes** Superheroes abound in this MMORPG.
- 8 Vanguard** Medieval fantasy from the creators of EverQuest.
- 9 Star Wars: Knights of the Old Republic** Solid Star Wars fantasies.
- 10 City of Villains** An expansion of City of Heroes.

Source: Top.com. Ranked by online buzz.

# AUCTION BLOCK MOD WORLD



**Computer Buyer's Guide** How to buy a micro for only a few grand, circa 1983. eBay price: \$172



**Original SimCity** Try this retro version of the popular game—Amiga only. eBay price: \$2.50

**Reboot Shirt** How to tell the world that you'd simply like to start over. eBay price: \$13.80



Allen Haid decided to look to the past for this case mod. He owned a 4-MHz Osborne Executive computer from the early 1980s, truly a classic PC, and updated it into a gaming system. He had to use a micro-ATX motherboard because of the limited space within the Osborne's case and went with an Athlon 64 X2 CPU—but you could guess that part, right? Also onboard are 2GB of memory and an nVidia GeForce 7800 GT graphics card.



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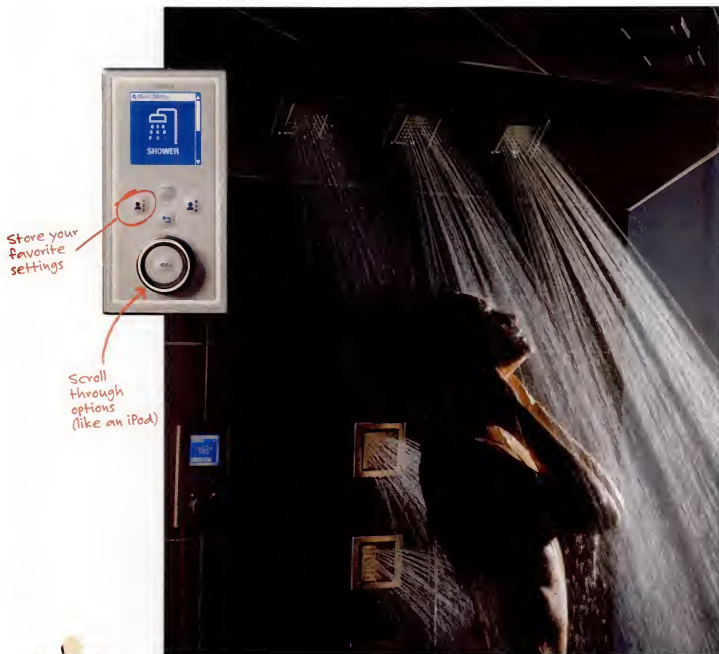
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JOHN C. DVORAK

*The human-centric talking computer is like the flying car—it works only in the movies.*



**I**N A RECENT TALK I GAVE FOR THE North Orange County Computer Club, I outlined the history of the personal computer from the early models developed by Edmund Berkeley in the 1950s to today's mouse-controlled GUI machines. The wow factor for the personal computer has been on a roller coaster over the years, but we're now on a straightaway.

The first computers made for the public were little more than relay machines, or in the case of an early IIP machine, analog computers. Whatever interest these devices held for the science-minded died around 1959 after users got tired of playing tic-tac-toe against them. Their big drawback (along with their feeble power) was that you had to use patch cords and toggle switches to program them. The Altair, launched in 1975, was toggle-oriented until Digital Research added an operating system, launching the new era of incredibly useful machines.

This was largely due to both the operating system and Don Lancaster's invention of the IV Typewriter—a system that pioneered the memory-mapped video that was a mainstay of early microcomputers. Rather than facing a stalled market, as in 1959, we ended up in a golden era of computer progress with

the emergence of the GUI, which was pioneered by the Xerox Star, then popularized by the Macintosh and universalized by Microsoft.

By 1995 the mouse-centric GUI was ubiquitous, and not much has changed since then. Everyone hopes that once we have achieved enough processing power, we can move to the next level. But what will that level be, and what happens until then?

Except for the Internet's becoming an extension of the PC, nothing seems to be emerging. Major advances reach fruition slowly. What's been longest in the labs, and what could cause a generational leap?

It's pretty obvious what we're waiting for: the humanlike talking and listening computer. IBM has been promoting this idea for decades. It's like the computer portrayed in the *Star Trek* series: You talk to it, ask it questions, and it talks back. But we haven't seen any breakthroughs in either speech recognition or humanlike interaction to make this a reality.

No matter what you've heard, voice recognition isn't nearly good enough to be useful. We expected the first breakthrough to be the typewriter that you could speak to, and it would type your words exactly. I first heard about this when I was a kid, and I'm still waiting. The computer that can talk to you in an understandable voice and make sense is even further away. Some scientists have made creepy faces that can mimic human emotion, but we want to talk to the computer, not some freaky manikin. It's unclear whether the roadblock to creating a human-centric interface is the processing power or the algorithms. I suspect it's both, but mostly the algorithms.

I hope we can someday realize this talking-computer dream, yet it may progress like the automobile instead. In the mid-20th century, people thought we'd all be driving flying cars by now. Instead, the car became merely a practical device that can double as a status symbol and a fashion statement. Can the same fate of practicality strike the computer?

*Star Trek's* computer could carry on a conversation while controlling the ship's climate and navigating at speeds faster than light. As a model, it's off the deep end of the credibility pool and laughable when you consider that the typical artificial computer voice hasn't changed much in 20 years. It's stereotyped as the voice of physicist Stephen Hawking.

The human-centric talking computer is like the flying car—it works only in the movies. ▀

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